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ANALYSIS OF FORECASTING METHODOLOGIES

FOR THE

U.S. ARMY ACCIDENT DATA

by

William J. Gray, Ph.D.

Meckinley Scott, Ph.D.

SCOTT-GRAY & ASSOCIATES

for

The U.S. Army Safety Center

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LIST OF ABBREVIATIONS

ANOVA - analysis of variance

DF - degrees of freedom

FY - fiscal year (October - September)

MALT - moving average correcting for linear trend

MLR - multiple linear regression

RSS - residual sum of squares

SM - simple mean of the months model

SMMALT - an SM model followed by a 12-point MALT

SMPL MA - 12-point simple moving average model

SMSMA - an SM model followed by an SMPL MA model

WM - weighted mean of the months model

WMA - weighted moving average

WMMALT - a WM model followed by a 12-point MALT

WMR - weighted mean from regression; method formerly used by USASC

WNT - white noise test

I. INTRODUCTION

One of the tasks of the U.S. Army Safety Center (USASC) is to prepare monthly forecasts for Army accident data and to disseminate the analyses of the forecasts to the various commands in the form of an informative and easily read report. In order to understand the magnitude of this task, one needs to look at not only the various time series involved in the preparation of the monthly forecasts but also at the nature of the data available to USASC personnel.

The time series which must be forecasted are divided according to

(1) the 18 major Army commands (MACOMs)

(2) the individual installations which are under the supervision of each MACOM, and

(3) the type of accident.

The accidents are classified into ten types: (1) Army motor vehicle, (2) Army combat vehicle, (3) personally owned vehicle, (4) marine, (5) other army vehicle, (6) fire, (7) explosive, (8) personal injury, (9) property damage, and (10) aviation.

The time series which must be forecasted are broken down as follows: first, there is a time series for the Army-wide total for each type of accident and a series for the total number of all types of accidents Army-wide. Then for each of the MACOMs, there are series corresponding to each type of accident and to the MACOM total. Next, for each of the numerous installations under each MACOM, the pattern is repeated: there is a time series for each type of accident which occurred and a series for the installation total. The total number of time series subject to monthly forecasting is in excess of 1700.

The historical data for each time series consists of the number of accidents which occurred each month over a five-year period, i.e., the length of each time series is 60 observations. The USASC believes that because of changes in major command~~ers~~s and other factors, the use of longer time series would be undesirable.

The sheer numbers of time series to be forecasted is by no means the only problem faced by USASC. A problem of major difficulty arises from the fact that when an accident occurs, USASC will not have a record of it until they receive an accident report, which may be as much as 12 months later. Thus, before forecasting the number of accidents for a given month for next year, USASC must look at the number of accidents for that month which have currently been reported for this year, and then based on historical data, try to estimate the final total for that month for this year. Thus, there arises the additional problem of estimating the percentage of unreported data for each month. As will be seen later, this theoretically has the effect of turning the forecasting problem into a multivariate problem in which 11 auxiliary series must be forecasted for each time series.

It is also important to note that the historical data in the USASC time series may change from time to time. When transfers occur within MACOMs, accident data is also transferred within the USASC database. As is pointed out by Kendall (9, p. 26), this type of impermanence is common in official time series. This may present problems for the analyst; it eliminates methods which use updating processes, and may require the retrieval of the full time series from the database at each forecasting period.

The USASC database is very extensive. It contains a record

corresponding to each individual accident. Fields within this record contain, among other information, data specifying (1) MACOM and installation, (2) type of accident, (3) the date the accident occurred, (4) the date of receipt of the accident report by USASC, and (5) the date the accident was recorded in the USASC database.

Fortunately, the design of the database allows the retrieval of information needed for certain analyses. However, the retrieval from the database of the data necessary for certain types of analyses may require time-consuming software development, extensive computer time, and may result in the creation of gigantic output files. Thus in applying techniques for forecasting and the estimation of unreported data, it is imperative to consider whether or not it is feasible to retrieve the necessary data from the database. <u>An outside analyst can usually only accomplish this through detailed consultation with appropriate USASC personnel.</u>

Our study has shown that the time series generated by these accident data result in many different models. Some are highly seasonal, some exhibit little or no seasonality, and except for a non-zero sample mean, many appear to be realizations of white noise series. Even within a single MACOM, different accident types have differently behaved series, and the series type of an installation may not correspond to that of its parent MACOM. Thus if one absolutely insisted that the best technique be applied to each series, then an extensive amount of modeling of individual series would be needed. Furthermore, the models would most likely be subject to frequent changes and the subsequent need for refitting. Such tailored modeling is totally unrealistic for USASC; the necessary number of personnel and the extraordinary cost would be

difficult to justify in any situation.

The above considerations and observations have shaped the nature of our study. While some of the analytical techniques used in what follows are not directly useful at USASC, our aim has always been that of trying to determine practical methods which yield acceptable results under the limitations imposed by the magnitude and difficulties of the problem. As a result, many excellent techniques where parameter estimates are require~~s~~d, such as the Box-Jenkins method and even exponential smoothing, have been eliminated as impractical.

Despite the vast numbers of series involved, the majority of U.S. Army accidents are actually explained by only a fractional number of the series. Thus, since it is not practical to choose a perfect model for each time series, our goal will be to choose models which can be easily implemented and which, within their limitations, (1) yield the best possible fit and forecasts for the most important series, and (2) cause the least distortion in the fit and forecasts for those series for which the model is not the perfect fit.

II. METHODS USED BY USASC

Prior to adopting the current method of producing forecasts, USASC used the following basic method: each time series was divided into 12 sub-series, one for each month of the fiscal year (October - September). The series for each month was then fitted by a simple linear regression, and the predicted value for the month of the following year was obtained from the regression equation. This method has some advantages; it is easy to implement and has the potential to detect trend in the series. The obvious disadvantages are that (1) only a few points are used to estimate the regression coefficients and (2) it assumes independence among the sets of observations for different months of the year.

The method currently used also assumes independence of observations for different months of the year. Again, each series is divided into 12 monthly series, each consisting of 5 observations. The prediction for the month of the next year is a weighted average with weights .4, .2, .2, .1, .1 with the most recent observations receiving the highest weight. Predictions are made for up to ~~6~~ 11 months in advance, e.g., the forecasts for April - September of FY 1987 were made on 22 April 1987. At that time it was assumed that data for April - September of FY 1986 was complete, and so an original forecast could be made by the above method using historical data for FY 1982-1986. The original forecast was then adjusted as follows: first, an estimation factor for each of the months October - March, FY 1987 was computed. To use October, FY 1987 as a typical example, its estimation factor was computed as

when data month is 6 mos old, we substitute actual data in data for estimate

$$F = \frac{\text{number of Oct FY 86 accidents reported by 22 Apr 86}}{\text{total number of Oct FY 86 accidents}}$$

The number of accidents for October, FY 87 which were reported as of 22 April 1987 was then divided by its estimation factor to obtain the estimated number of accidents for October 1987. This was done for each month of October - March, FY 1987. Next, a forecast adjustment factor was computed as

$$A = \frac{\text{Sum of original forecasts for Oct-Mar, FY 87}}{\text{Sum of estimates for Oct-Mar, FY 87}}$$

The forecast for each month of April - September, FY 1987, was obtained by dividing its original forecast by the adjustment factor A (see Table 1).

The forecasts made during the next month would be obtained by simply moving the entire series forward by one month.

As was pointed out earlier, this method assumes independence among sets of observations for different months. Depending on the series, this assumption may or may not be justifiable. The weights are chosen arbitrarily to give higher weights to recent observations. As is pointed out by Kendall (9, p. 34-35), the arbitrary choice of weights in a moving average may lead to a dramatic increase in the residual sum of squares (RSS). Despite these drawbacks, we found that in the series we examined, when the series is purely seasonal the current model yields surprisingly good results. The value of the RSS for the current method is percentage-wise only slightly higher than the true multiple regression method of taking the simple mean of the months as the predictor. The predictions produced by the current model sometimes appeared to be better than those produced by the simple mean model.

TABLE 1

Current Army Mishap Class A-C Ground Accidents (DA Form 285 Less FECA Civilian Only)

'MACOM' Basic Data as of 22 Apr 87

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1.	FY82	1260	1077	983	1440	1253	1521	1362	1648	1735	1593	1344	1352
2.	FY83	1294	1112	1000	1311	1222	1408	1246	1606	1710	1616	1458	1306
3.	FY84	1192	1079	1057	1308	1233	1310	1328	1695	1722	1519	1475	1301
4.	FY85	1316	1096	955	1612	1301	1427	1429	1661	1754	1556	1452	1210
1 5.	FY86	1189	1027	877	1339	1065	1235	1153	1308	1526	1398	1356	1205
2 6.	FY87	1127	1003	799	999	919	558	(Number of FY87 Accidents Recorded as of 22 Apr 87)					
7.	SFY86	1123	946	778	1092	740	436	(Number of FY86 Accidents Recorded as of 22 Apr 86)					
8.	ORIG FCST	1233	1065	952	1395	1180	1334	1273	1520	1650	1495	1408	1250
9.	EST FACTOR	.9445	.9211	.8871	.8155	.6948	.3530						
3 10.	EST FY87	1193	1089	901	1225	1323	1235						

11\. ORIG FCST ADJUSTMENT FACTOR = $\frac{\text{Sum of Orig Fcst Thru Report Month (Mar)}}{\text{Sum of Est FY87 Thru Report Month (Mar)}} = \frac{7159}{6966} = 1.0277$

3 12. ADJUSTMENT ORIGINAL FCST = $\frac{\text{Orig Fcst}}{\text{Orig Fcst Adjustment Factor}} = \frac{\text{Orig Fcst}}{1.0277} =$

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3 12.	ADJUSTMENT ORIGINAL FCST							1239	1479	1606	1455	1370	1216
4 13.	CUMULATIVE FY87 GOAL (.88 x cum FY82)	1109	2057	2922	4189	5291	6630	7828	9279	10806	12207	13390	14580

Keys to Using Table 1

(Keys and Table 1 were supplied by USASC)

A. Data shown on Table 1 are numbers of accidents experienced by a MACOM based on current Army mishap classification criteria, excluding accidents involving injury to Army civilians only that would be reported under the Federal Employees Compensation Act (FECA). Included are accidents which involve, in addition to an injury to FECA civilians, reportable property damage or injury to other Army personnel (military or other Army civilian). Reportable property damage for these accidents was $700 or greater.

B. Table 1 is addressed line by line as follows:

1. Lines 1 through 6 are the monthly number of accidents in the ASMIS on 22 April 1987 based on the criteria in A, above.

2. Line 7 is the number of FY 86 accidents in the ASMIS on 22 April 1986.

3. Line 8 is the monthly original forecast derived using a weighted average method. A weight of one was given FY 82 and FY 83, a weight of two was given FY 84 and FY 85, and a weight of four was given FY 86. Example: The October original forecast = [(1 x 1260) + (1 x 1294) + (2 x 1192) + 2 x 1316) + 4 x 1189)] ÷ [10] = 1233.

4. Line 9 is the estimation factor derived by dividing line 7 by line 5. This is the proportion of FY 86 accidents in the ASMIS on 22 April 1986.

5. Line 10 is the estimation of the final number of accidents expected after all reports are received. This number is derived by dividing line 6 by line 9. This is based on the assumption that the number of FY 87 accidents in the ASMIS on 22 April 1987 represents the same proportion of FY 86 accidents which were in the ASMIS on 22 April 1986.

6. Line 11 is the factor for adjusting the original monthly forecast and is derived by dividing the original monthly forecast (line 8) cumulative through the report month by the estimated FY 87 actual (line 10) cumulated through the report month.

7. Line 12 is the adjusted original forecast for the months following the report month. The adjustment is made by dividing the original monthly forecast (line 8) by the adjustment factor (line 11). If the adjustment factor is less than one this is an indication the original forecast through the report month is lower than the actual estimated values. The monthly forecasts for the remaining months are increased by dividing the factor into the original monthly forecasts. If the factor is greater than one the division reduces the original monthly forecasts.

8. Line 13 is the FY 87 cumulative monthly goals which were derived by multiplying the monthly cumulated values of line 1 (FY 82) by .88, the 12 percent reduction factor.

C. Encircled numbers to left of line numbers on Table 1 refer to lines similarly identified on matrix following the table. The actual numbers or cumulated values are shown on the referenced lines.

******RECOMMENDATION******

The adjustment factor A discussed above is computed as a ratio of means, and usually is a biased estimat~~ion~~or. If our later recommendations are adopted, this adjustment may not be needed. In the meantime, we recommend that the method of computing A be immediately changed as follows: for the six months immediately preceding the month in which forecasts are made, first compute r(i), i=1, . . . ,6 by

$$r(i) = \frac{\text{original forecast for month } i}{\text{estimated final total for month } i}$$

Then let

$$A = [(r(1) + r(2) + \ldots + r(6)] / 6 = 1.0298$$

This value of A is an unbiased estimator.

substitute for line 11 on p.7, Table 1 even though the results are close but will produce better results across the months.

good - statistically more sound. (needs to be demonstrated that would produce a better forecast before implementation)

* *

In using A, we are considering the ratio of terms of the two series of original forecasts and estimated final totals for each month. It is hypothesized that the ratios of the corresponding series of random variables have a common mean. If so, then A is a sample estimate of that common mean.

III. METHOD OF ANALYSIS OF THE TIME SERIES

The initial phase of the study was devoted to determining the nature of the time series for the U.S. Army accident data. Of course, it was not practical to perform a detailed analysis of all the series involved, and so we chose what we believed to be representative samples.

There are many diagnostic methods for analyzing time series. We found the following procedures to be the most useful.

First, an analysis of variance (ANOVA) was performed to obtain initial indications of trend and/or seasonality. The type of ANOVA used is described in some elementary texts. This is a randomized block ANOVA which uses months as one independent variable and years as the other. Thus it is a test for a significant statistical difference between the means of the months and the grand mean of the series or a similar significant statistical difference between means of the year and the grand mean. Although this simple test frequently is effective as an indicator of trend and seasonality when they exist, it is highly qualititative since it gives no information as to the type of trend.

The periodograms (see Appendix I) of selected series were also computed. The sample statistics of the periodogram can be useful in two ways:

(1) If the series is not stationary, the sample statistics usually exhibit a spike at frequency zero, which is an indication of some type of trend in the series. A simplified discussion of this situation may be found in Kendall (9, p. 97).

(2) The sample periodogram is also useful in locating certain latent frequencies, especially seasonality, in the series.

The white noise test (see Appendix I) was performed on each series at the 10% level of significance. This test is useful as an indicator of whether or not the series is, apart from a non-zero mean, essentially observations of a white noise series.

The general assumption in model fitting is that the time series [X(t)] is of the form X(t) = Y(t) + R(t) where

(1) the X(t) are the observed values,

(2) the Y(t) are the fitted values obtained from the model, and

(3) the R(t) are the residual values, which should be random, or a white noise series.

Thus the white noise test can be applied to the residual series [R(t)]. If the residuals pass the white noise test (WNT), then we cannot reject the hypothesis that the chosen model is a proper one.

- model is good if:
  residuals are random (white noise test is passed)
- model is not good if:
  residuals are not random (white noise test is not passed)

passed = series is essentially white noise

IV. THE NATURE OF THE TIME SERIES FOR THE U.S. ARMY ACCIDENT DATA

This section summarizes the most significant results of our investigation into the nature of some of the time series for the U.S. Army accident data. These results are based on data for FY 1982 - 1986 as provided by USASC as of late 1987 and early 1988.

In some of the time series which exhibited seasonality or seasonality and a possible trend, a multiple linear regression (MLR) was performed. In these MLR analyses, we use dummy variables to remove seasonality. When appropriate, we also include terms for fitting trend. The technique for fitting seasonal series with the use of dummy variables is discussed in Bowerman and O'Connell (2, Chapter 8). When the series is purely seasonal and only dummy variables appear, the MLR is a one-way ANOVA with months as the independent variable. See Draper and Smith (4, Chapter 9). In this case the fitted and predicted value for a given month is the simple mean of all observations for that month. Since we performed the MLR with a general regression software package, it appears we chose a difficult course. However, this approach also produces an additional analysis consisting of a case by case study of the residuals. While some of the statistics produced by such studies are not applicable here, others are useful in identifying outliers (T for outlier) and influential cases (Cook's distance). See Weisberg (12, pp. 100-117) for a discussion of these statistics.

MLR to identify trend? ? + seasonality ?

MLR -
not as a candidate forecast
but just to get an idea of
how much trend, seasonality
+ error present in data to get idea of
what kinds of candidate forecast models to
try

FORSCOM TOTAL

The initial ANOVA indicated strong seasonality and the possibility of a weak trend (Table 2). The periodogram strongly confirmed the presence of a 12-month cycle in the data (Table 3).

An MLR was performed using dummy variables and time as independent variables (Table 4). The regression coefficient for the variable time was found to be significant at the 5 percent significance level. Then the time variable was removed from the model and the MLR was repeated using dummy variables as the only independent variables. The ANOVA table for regression yielded an F-ratio of 10.1 with 11 and 48 DF (Table 5). Neither residual series from these regressions passed the WNT. An inspection of the residual analyses in Tables 4 and 5 reveals that there are two gross outliers, Case 6 and 56. (We later found that Case 6 was the result of an unusual occurrence which resulted in a large number of individual accidents.) These cases were replaced by the means of the other four observed values for the corresponding months and the MLRs were repeated. The regression coefficient involving time ~~was insignificant~~ appeared to be of marginal significance at ~~any reasonable significance level~~ (Table 6A). The regression using dummy variables alone was very significant (Table 6B). The residuals from this last MLR passed the WNT (Table 7).

An extensive search was made for a model which would produce a better fit. At best, other models produced indifferent results. The systematic variation in this series appears to be mainly due to seasonal fluctuations.

Table 2
ANOVA for Trend and Seasonality in FORSCOM Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR (trend)	4	14040.4023	3510.10059	3.10244012
MO (seasonality)	11	147774.984	13434.0895	11.8738643
ERROR	44	49781.5977	1131.39995	
TOTAL	59	211596.984		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	425.333334	MO 1	404.4
YEAR 2	420.5	MO 2	325.2
YEAR 3	405	MO 3	314.6
YEAR 4	429.583334	MO 4	423.6
YEAR 5	388	MO 5	368.4
		MO 6	457.6
		MO 7	414.6
		MO 8	474.6
		MO 9	444.8
		MO 10	445
		MO 11	449.8
		MO 12	441.6

GRAND MEAN 413.683333 STD DEVIATION 59.8864723

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 6.6
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 69.8
PROPORTION OF VARIABILITY DUE RESIDUAL 23.5

need to explain how & why did this

Table 3
Periodogram for FORSCOM Total

PERIODOGRAM FROM FILE FORSCOM/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	529.208145	529.208145	-2.78886064	-3.14046619
.0333333334	6661.11138	7190.31952	-13.653003	5.96930119
.05	3055.03363	10245.3532	1.98868074	9.89341212
.0666666667	1553.16138	11798.5145	1.81936848	6.96146138
.0833333334	96375.2845	108173.799	.322668374	-56.6780855
.1	1348.87306	109522.672	-6.07040239	2.84827142
.116666667	2182.95064	111705.623	-7.89901597	-3.22033664
.133333333	1234.3987	112940.021	6.12101847	-1.91826906
.15	307.292216	113247.314	-3.17457465	.406386085
.166666667	7581.99362	120829.307	14.2124996	-7.12305939
.183333333	1555.14259	122384.45	-6.9495782	1.88187382
.2	1130.89382	123515.344	3.38940528	5.11941329
.216666667	2013.60796	125528.952	5.26925275	-6.27337555
.233333333	2193.10507	127722.057	4.01485684	7.54880301
.25	22641.6852	150363.742	26.7083332	6.43333344
.266666667	300.765022	150664.507	-3.11642491	.559818308
.283333333	1250.8506	151915.357	6.43957273	-.476364617
.3	1335.92258	153251.28	-6.43376405	-1.77128
.316666667	1406.38297	154657.663	-.929326868	6.78349349
.333333333	2536.82653	157194.49	-5.52083347	7.35399771
.35	149.208	157343.698	.294966932	2.2105643
.366666667	3411.19113	160754.889	4.11291046	-9.8382081
.383333333	1495.31925	162250.208	-4.11594106	5.73611402
.4	1307.0028	163557.211	5.83976215	3.07635142
.416666667	12397.4343	175954.645	-20.2309999	-1.98858118
.433333333	1862.23442	177816.88	-3.52059496	7.0483964
.45	1461.45716	179278.337	3.34925858	6.12353703
.466666667	856.067439	180134.404	-5.30313057	-.64217404
.483333333	741.171078	180875.575	4.71556394	1.57135588
.5	5336.66719	186212.243	13.3375	5.77657585E-07

Table 3 (cont'd)
WNT for FORSCOM Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	2.84196215E-03	0	.258882759	.0826517957	
2	.0386135703	0	.293365517	1.07586195	
3	.0550197615	0	.327848276	.48371547	
4	.0633605739	0	.362331035	.243918035	
5	.580916688	0	.396813793	31.1106177	***
6	.588160427	0	.431296552	.211601241	***
7	.599883344	.0169793103	.46577931	.343997243	***
8	.606512332	.051462069	.500262069	.193523516	***
9	.608162558	.0859448276	.534744828	.0479356464	***
10	.648879503	.120427586	.569227586	1.23091031	***
11	.657230955	.154910345	.603710345	.244231794	***
12	.663304099	.189393103	.638193104	.177197331	***
13	.674117609	.223875862	.672675862	.317019892	***
14	.685895058	.258358621	.707158621	.345616483.	
15	.807485802	.292841379	.741641379	4.01422408	***
16	.809100975	.327324138	.776124138	.0469157986	***
17	.815818313	.361806897	.810606897	.19612021	***
18	.822992506	.396289655	.845089655	.209554991	
19	.830545087	.430772414	.879572414	.220691633	
20	.844168394	.465255173	.914055172	.400532479	
21	.844969673	.499737931	.948537931	.0232557329	
22	.863288507	.53422069	.98302069	.541159599	
23	.871318695	.568703449	1	.234760618	
24	.878337582	.603186207	1	.204986519	
25	.944914485	.637668966	1	2.06844054	
26	.954915087	.672151724	1	.292947091	
27	.962763427	.706634483	1	.229402313	
28	.967360695	.741117241	1	.133936492	
29	.971340944	.7756	1	.115888484	
30	1	.810082759	1	.85563431	

DF FOR F-RATIOS 2 AND 58

Table 4
MLR for FORSCOM Total
Using Time and Dummy Variables (D1-D11)
as Independent Variables

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	12	152936.392	12744.6993	10.2112995
ERROR	47	58660.5916	1248.09769	
TOTAL	59	211596.984		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
TIME	-.546527786	.268752443	30.5	-2.03357327
D1	-12.2892361	15.1987764	-3.88051073E-12	-.808567465
D2	-90.9427084	15.1749967	-3.88051073E-12	-5.99293102
D3	-100.996181	15.1559461	-3.88051073E-12	-6.66379915
D4	8.55034726	15.1416424	-3.88051073E-12	.564690872
D5	-46.103125	15.1320991	-3.88051073E-12	-3.04671048
D6	43.6434028	15.1273252	0	2.88507071
D7	1.18993059	15.1273252	0	.0786610038
D8	61.7364585	15.1320991	0	4.0798344
D9	32.4829862	15.1416424	0	2.14527495
D10	33.2295138	15.1559461	0	2.19250673
D11	38.5760416	15.1749967	0	2.54207908

Y-INTERCEPT 430.352431

DF FOR T-TEST ON REGRESSION COEFFS.: 47
STANDARD ERROR OF ESTIMATE: 35.3284261
MEAN OF DEPENDENT VARIABLE: 413.683334
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 8.53996845
PCT OF VARIANCE EXPLAINED BY REGRESSION: 72.277208
NUMBER OF OBSERVATIONS: 60

Table 4 (cont'd)
Residual Analysis

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I,I)	COOK'S DIST.	T FOR OUTLIER
1	403	417.516667	-14.516667	-.410906134	-.469287876	.233333333	5.15591228E-03	-.465360175
2	308	338.316667	-30.316667	-.858138057	-.980062725	.233333333	.0224871592	-.979642452
3	329	327.716667	1.28333306	.0363257921	.0414869781	.233333333	4.02949347E-05	.0410440059
4	431	436.716667	-5.71666706	-.161814937	-.184805681	.233333333	7.99571837E-04	-.182895557
5	414	381.516667	32.4833329	.919467308	1.05010567	.233333333	.025816232	1.05128012
6	576	470.716667	105.283333	2.98013086	3.40354929	.233333333	.271200783	3.87893151
7	417	427.716667	-10.7166671	-.303344027	-.346443293	.233333334	2.80990197E-03	-.343176372
8	507	487.716667	19.2833328	.545830509	.623382371	.233333334	9.0977895E-03	.61920047
9	426	457.916667	-31.9166671	-.90342737	-1.03178677	.233333334	.0249233696	-1.03251184
10	447	458.116667	-11.1166669	-.31466635	-.359374297	.233333333	3.0235759E-03	-.356020096
11	417	462.916667	-45.9166669	-1.29970082	-1.48437207	.233333333	.051583689	-1.5041771
12	429	454.716667	-25.7166669	-.727931294	-.831356122	.233333333	.0161808395	-.828579208
13	427	410.958334	16.0416664	.454072489	.510333421	.208333333	5.27206883E-03	.50627982
14	365	331.758334	33.2416665	.94093256	1.0575169	.208333333	.022638502	1.05887984
15	312	321.158334	-9.15833355	-.259234122	-.291354001	.208333333	1.71836344E-03	-.288498474
16	426	430.158334	-4.15833366	-.117705036	-.13228904	.208333333	3.54258907E-04	-.130898515
17	366	374.958334	-8.95833361	-.253572961	-.284991405	.208333334	1.64413159E-03	-.282187208
18	436	464.158334	-28.1583337	-.797044668	-.895800872	.208333333	.0162441134	-.893883597
19	408	421.158334	-13.1583335	-.372457394	-.418605973	.208333334	3.54718544E-03	-.414902942
20	469	481.158334	-12.1583338	-.344151583	-.386792988	.208333334	3.02851853E-03	-.383266532
21	463	451.358334	11.6416664	.329526891	.370356252	.208333334	2.77659421E-03	.366930922
22	474	451.558334	22.4416665	.635229727	.713936579	.208333333	.0103179238	.710161952
23	460	456.358334	3.64166653	.10308035	.115852312	.208333333	2.71695509E-04	.114629583
24	440	448.158334	-8.15833354	-.230928304	-.259541008	.208333333	1.36359382E-03	-.256949288
25	401	404.4	-3.40000022	-.0962397873	-.107599353	.2	2.22646554E-04	-.106461638
26	293	325.2	-32.2000002	-.911447344	-1.01902911	.2	.0199696216	-1.01945494
27	310	314.6	-4.60000015	-.130206767	-.145575591	.2	4.0754332E-04	-.144051068
28	374	423.6	-49.6000002	-1.40396858	-1.56968459	.2	.0473828789	-1.59527392
29	374	368.4	5.59999979	.158512575	.177222446	.2	6.03996066E-04	.175385575
30	419	457.6	-38.6000001	-1.09260458	-1.22156905	.2	.0286967491	-1.22815779
31	426	414.6	11.3999999	.322686321	.360774275	.2	2.50303995E-03	.357410851
32	506	474.6	31.3999998	.888802678	.993711603	.2	.0189896683	.993576213
33	415	444.8	-29.8000002	-.843513382	-.943076631	.2	.0171037218	-.941944863
34	380	445	-65	-1.83987817	-2.05704633	.2	.0813738383	-2.13334293
35	507	449.8	57.1999999	1.61909279	1.81020077	.2	.0630159	1.85673457
36	455	441.6	13.3999999	.379297957	.424068008	.2	3.4583399E-03	.420337319
37	382	397.841667	-15.8416668	-.448411338	-.503970836	.208333333	5.14142922E-03	-.499933261
38	345	318.641667	26.3583334	.746094186	.838537475	.208333333	.0142337064	.835844805
39	297	308.041667	-11.0416666	-.312543406	-.351268463	.208333333	2.49776303E-03	-.347968536
40	462	417.041667	44.9583333	1.2725824	1.43025914	.208333333	.0414097411	1.44679748
41	363	361.841667	1.15833318	.0327875682	.0368500454	.208333333	2.74883775E-05	.0364564426
42	452	451.041667	.958333254	.0271264067	.0304874491	.208333333	1.88154768E-05	.030161669
43	437	408.041667	28.9583333	.819689311	.921251254	.208333334	.0171802404	.919739962
44	491	468.041667	22.9583331	.649854399	.730373292	.208333334	.0107984847	.726697327
45	508	438.241667	69.7583332	1.97456668	2.21922137	.208333334	.0996952122	2.32042314
46	497	438.441667	58.5583334	1.65754153	1.86291585	.208333333	.0702521349	1.91504989
47	462	443.241667	18.7583334	.530969972	.596758731	.208333333	7.20892675E-03	.592625545
48	459	435.041667	23.9583334	.678160224	.762186292	.208333333	.011759675	.758737977
49	409	391.283333	17.7166667	.501484743	.572735937	.233333333	7.67954907E-03	.568597921
50	315	312.083333	2.91666675	.082558638	.094288609	.233333333	2.08135092E-04	.0932889693
51	325	301.483333	23.5166668	.665658489	.760235567	.233333333	.0135307921	.75677187
52	425	410.483334	14.5166667	.410906124	.469287864	.233333333	5.15591202E-03	.465360163
53	325	355.283334	-30.2833334	-.857194524	-.978985134	.233333333	.0224377367	-.978542889
54	405	444.483334	-39.4833334	-1.11760805	-1.27639834	.233333333	.0381416354	-1.28521827
55	385	401.483334	-16.4833334	-.466574234	-.532865325	.233333334	6.64755247E-03	-.528765728
56	400	461.483334	-61.4833335	-1.74033605	-1.98760383	.233333334	.0924882372	-2.05458935
57	412	431.683334	-19.6833334	-.557152853	-.636313398	.233333334	9.4791411E-03	-.632236894
58	427	431.883333	-4.88333321	-.138226741	-.157866063	.233333333	5.83451024E-04	-.15621903
59	403	436.683333	-33.6833332	-.953434298	-1.0888987	.233333333	.0277588717	-1.0911033
60	425	428.483333	-3.48333323	-.0985985964	-.112607532	.233333333	2.96866871E-04	-.11141817

DF FOR T-TEST FOR CASE BEING OUTLIER: 46
T(2,1)= 25631977.4
T(1,1)=-3.99160385E-03
T(1,2)= 181203.316
STATISTIC FOR DURBIN-WATSON TEST: D= 1.51838281 4-D= 2.48161719
SUM OF SQUARES OF RESIDUALS 58660.5917

Table 5
MLR for FORSCOM Total
Using Dummy Variables (D1-D11) as Independent Variables

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	11	147774.983	13434.0894	10.1036679
ERROR	48	63822.0002	1329.625	
TOTAL	59	211596.984		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
D1	-9.2833332	15.6129621	-3.88051073E-12	-.594591415
D2	-88.4833335	15.612962	-3.88051073E-12	-5.6672996
D3	-99.0833334	15.6129621	-3.88051073E-12	-6.34622265
D4	9.91666676	15.6129621	-3.88051073E-12	.635156015
D5	-45.2833333	15.612962	-3.88051073E-12	-2.90036786
D6	43.9166667	15.6129621	0	2.81283375
D7	.91666672	15.6129621	0	.0587119034
D8	60.9166668	15.6129621	0	3.90167263
D9	31.1166667	15.6129621	0	1.99300213
D10	31.3166667	15.6129621	0	2.005812
D11	36.1166665	15.612962	0	2.31324885

Y-INTERCEPT 413.683334

DF FOR T-TEST ON REGRESSION COEFFS.: 48
STANDARD ERROR OF ESTIMATE: 36.4640234
MEAN OF DEPENDENT VARIABLE: 413.683334
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 8.81447727
PCT OF VARIANCE EXPLAINED BY REGRESSION: 69.8379443
NUMBER OF OBSERVATIONS: 60

Table 5 (cont'd)
Residual Analysis

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I.I)	COOK'S DIST.	T FOR OUTLIER
1	403	404.400001	-1.40000033	-.038394017	-.042925816	.2	3.83880349E-05	-.0424771339
2	308	325.2	-17.2000002	-.471697815	-.52737419	.2	5.79424033E-03	-.523370264
3	329	314.6	14.3999999	.394909791	.441522569	.2	4.06129539E-03	.437789068
4	431	423.6	7.39999974	.202939749	.226893537	.2	1.0725141E-03	.224638119
5	414	368.4	45.5999998	1.25054768	1.39815481	.2	.0487257681	1.41257717
6	576	457.6	118.4	3.24703609	3.63029671	.2	.274563629	4.21765226
7	417	414.6	2.39999974	.065818292	.0735870875	.2	1.12813739E-04	.0728206285
8	507	474.6	32.3999998	.888547031	.993425782	.2	.020560308	.99328731
9	426	444.8	-18.8000002	-.515576682	-.576432254	.2	6.922378E-03	-.572380707
10	447	445	1.99999988	.0548485794	.061322576	.2	7.83428817E-05	.0606828142
11	417	449.8	-32.8000001	-.899516757	-1.00569031	.2	.021071104	-1.00581243
12	429	441.6	-12.6000002	-.345546075	-.386332256	.2	3.10942941E-03	-.382882517
13	427	404.400001	22.5999997	.619788975	.692945139	.2	.0100036035	.689144598
14	365	325.2	39.7999998	1.09148679	1.22031933	.2	.031024568	1.22671992
15	312	314.6	-2.60000014	-.0713031613	-.0797193579	.2	1.323995E-04	-.0788897999
16	426	423.6	2.39999974	.065818292	.0735870875	.2	1.12813738E-04	.0728206285
17	366	368.4	-2.40000021	-.0658183051	-.0735871021	.2	1.12813783E-04	-.072820643
18	436	457.6	-21.6000002	-.592364696	-.662283864	.2	9.13791493E-03	-.658363703
19	408	414.6	-6.60000027	-.18100033	-.202364521	.2	8.53154154E-04	-.200330937
20	469	474.6	-5.60000027	-.153576039	-.171703231	.2	6.14208324E-04	-.169957445
21	463	444.8	18.1999998	.499122097	.558035469	.2	6.48757468E-03	.55399196
22	474	445	28.9999999	.795304445	.889177401	.2	.0164715927	.887203553
23	460	449.8	10.1999999	.279727769	.312745154	.2	2.03769856E-03	.309786031
24	440	441.6	-1.60000014	-.04387887	-.0490580681	.2	5.01394592E-05	-.0485455739
25	401	404.400001	-3.40000034	-.0932425996	-.104248396	.2	2.26411E-04	-.103168439
26	293	325.2	-32.2000002	-.883062185	-.987293537	.2	.020307261	-.987028424
27	310	314.6	-4.60000015	-.126151744	-.141041937	.2	4.14433919E-04	-.139593947
28	374	423.6	-49.6000003	-1.36024486	-1.52079998	.2	.0481840122	-1.54249552
29	374	368.4	5.59999979	.153576025	.171703216	.2	6.14208219E-04	.16995743
30	419	457.6	-38.6000001	-1.05857765	-1.18352579	.2	.0291819437	-1.1886038
31	426	414.6	11.3999997	.312636914	.349538696	.2	2.54536042E-03	.346319539
32	506	474.6	31.3999998	.86112274	.962764492	.2	.0193107389	.962016819
33	415	444.8	-29.8000002	-.817243887	-.913706442	.2	.0173929055	-.912105448
34	380	445	-65.0000001	-1.78257894	-1.99298384	.2	.082749679	-2.05915079
35	507	449.8	57.1999999	1.56866946	1.75382577	.2	.0640813507	1.79388958
36	455	441.6	13.3999999	.3674855	.410861279	.2	3.5168123E-03	.407275735
37	382	404.400001	-22.4000003	-.614304135	-.686812902	.2	9.82733255E-03	-.682985193
38	345	325.2	19.7999998	.543000963	.607093533	.2	7.67838662E-03	.603056068
39	297	314.6	-17.6000002	-.482667531	-.539638705	.2	6.06687358E-03	-.535615109
40	462	423.6	38.3999998	1.05309278	1.17739352	.2	.028880323	1.18226158
41	363	368.4	-5.40000022	-.148091179	-.165570972	.2	5.71119721E-04	-.163884002
42	452	457.6	-5.60000015	-.153576035	-.171703227	.2	6.14208297E-04	-.169957441
43	437	414.6	22.3999998	.614304118	.686812884	.2	9.82733205E-03	.682985175
44	491	474.6	16.3999997	.44975837	.502845145	.2	5.26777582E-03	.498895375
45	508	444.8	63.1999998	1.73321521	1.93779351	.2	.0782300769	1.99721372
46	497	445	51.9999999	1.42606314	1.59438707	.2	.0529597941	1.62120474
47	462	449.8	12.1999999	.334576352	.374067733	.2	2.91513893E-03	.370691389
48	459	441.6	17.3999999	.477182665	.533506438	.2	5.92977332E-03	.529492048
49	409	404.400001	4.59999967	.126151731	.141041923	.2	4.14433834E-04	.139593933
50	315	325.2	-10.2000002	-.279727776	-.312745161	.2	2.03769866E-03	-.309786039
51	325	314.6	10.3999999	.285212626	.31887741	.2	2.11839172E-03	.315873036
52	425	423.6	1.39999974	.0383940006	.0429257977	.2	3.83880023E-05	.0424771158
53	325	368.4	-43.4000002	-1.19021425	-1.33069998	.2	.0368908843	-1.34174726
54	405	457.6	-52.6000002	-1.44251773	-1.61278385	.2	.0541889946	-1.64097625
55	385	414.6	-29.6000003	-.81175903	-.907574186	.2	.0171602272	-.905876689
56	400	474.6	-74.6000003	-2.04585214	-2.28733223	.2	.108997682	-2.39782864
57	412	444.8	-32.8000002	-.89951676	-1.00569031	.2	.0210711043	-1.00581244
58	427	445	-18.0000001	-.493637247	-.55190322	.2	6.34577426E-03	-.54786505
59	403	449.8	-46.8000001	-1.28345684	-1.43494836	.2	.0428974333	-1.45139407
60	425	441.6	-16.6000002	-.45524324	-.508977415	.2	5.39704185E-03	-.505012292

DF FOR T-TEST FOR CASE BEING OUTLIER: 47
T(2,1)= 27921287.1
T(1,1)=-4.61578369E-03
T(1,2)=-1.97460938
STATISTIC FOR DURBIN-WATSON TEST: D= 1.39601642 4-D= 2.60398358
SUM OF SQUARES OF RESIDUALS 63822

Table 6A
MLR for FORSCOM Total
Using Time and Dummy Variables (D1-D11)
As Independent Variables - 2 Outliers Removed

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	12	152979.23	12748.2692	15.5347059
ERROR	47	38569.6811	820.631512	
TOTAL	59	191548.911		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT, B	STD ERROR	MEAN	T (FOR B=0)
TIME	-.211458347	.217922577	30.5	-.970337033
D1	-9.53385417	12.3241913	-3.88051073E-12	-.773588624
D2	-88.522396	12.3049091	-3.88051073E-12	-7.19407151
D3	-98.9109376	12.2894616	-3.88051073E-12	-8.04843539
D4	10.3005209	12.2778632	-3.88051073E-12	.838950616
D5	-44.6880208	12.2701248	-3.88051073E-12	-3.64201843
D6	15.1234375	12.2662538	0	1.23293042
D7	1.93489587	12.2662538	0	.157741385
D8	80.7963544	12.2701248	0	6.58480297
D9	32.5578126	12.2778632	0	2.65174909
D10	32.9692708	12.2894616	0	2.68272703
D11	37.9807291	12.3049091	0	3.08663224

Y-INTERCEPT 419.220313

DF FOR T-TEST ON REGRESSION COEFFS.: 47
STANDARD ERROR OF ESTIMATE: 28.6466667
MEAN OF DEPENDENT VARIABLE: 412.770834
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 6.94008985
PCT OF VARIANCE EXPLAINED BY REGRESSION: 79.8643173
NUMBER OF OBSERVATIONS: 60

Table 6B
MLR for FORSCOM Total
Using Dummy Variables Alone as Independent Variables
2 Outliers Removed

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	11	152206.561	13836.9601	16.8819119
ERROR	48	39342.35	819.632292	
TOTAL	59	191548.911		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
D1	-8.37083327	12.2583001	-3.88051073E-12	-.682870645
D2	-87.5708334	12.2583001	-3.88051073E-12	-7.14379914
D3	-98.1708333	12.2583001	-3.88051073E-12	-8.00851936
D4	10.8291668	12.2583001	-3.88051073E-12	.883415051
D5	-44.3708333	12.2583001	-3.88051073E-12	-3.61965632
D6	15.2291666	12.2583001	0	1.24235551
D7	1.8291667	12.2583001	0	.149218626
D8	80.4791668	12.2583001	0	6.56527956
D9	32.0291667	12.2583001	0	2.6128555
D10	32.2291666	12.2583001	0	2.62917097
D11	37.0291665	12.2583	0	3.02074238

Y-INTERCEPT 412.770834

DF FOR T-TEST ON REGRESSION COEFFS.: 48
STANDARD ERROR OF ESTIMATE: 28.629221
MEAN OF DEPENDENT VARIABLE: 412.770834
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 6.93586335
PCT OF VARIANCE EXPLAINED BY REGRESSION: 79.4609379
NUMBER OF OBSERVATIONS: 60

Table 6B (cont'd)
Residual Analysis

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I,I)	COOK'S DIST.	T FOR OUTLIER
1	403	404.400001	-1.40000033	-.0489010978	-.0546730894	.2	6.22738897E-05	-.0541022652
2	308	325.2	-17.2000003	-.600784783	-.671697807	.2	9.39954048E-03	-.667810092
3	329	314.6	14.3999997	.502982591	.562351633	.2	6.58831977E-03	.558305157
4	431	423.600001	7.39999962	.258477156	.288986246	.2	1.73985522E-03	.286209218
5	414	368.400001	45.5999997	1.59277822	1.78078019	.2	.06606621	1.82339425
6	428	428	-2.38418579E-07	-8.32780534E-09	-9.31076942E-09	.2	1.80605057E-18	-9.21327178E-09
7	417	414.6	2.39999974	.0838304242	.0937252636	.2	1.83008855E-04	.0927523078
8	507	493.250001	13.7499996	.480278512	.536967701	.2	6.00696483E-03	.532947958
9	426	444.800001	-18.8000003	-.656671739	-.734181324	.2	.0112296295	-.730607155
10	447	445	1.99999976	.0698586862	.0781043855	.2	1.2788948E-04	.0772914277
11	417	449.8	-32.8000001	-1.14568259	-1.28091208	.2	.0341819947	-1.28973351
12	429	441.6	-12.6000003	-.440109784	-.492057698	.2	5.04418287E-03	-.488137804
13	427	404.400001	22.5999997	.789403236	.882579649	.2	.0162280591	.880511441
14	365	325.2	39.7999997	1.39018801	1.55427745	.2	.0503287162	1.57822967
15	312	314.6	-2.60000026	-.090816312	-.101535724	.2	2.14781316E-04	-.100483285
16	426	423.600001	2.39999962	.08383042	.0937252589	.2	1.83008837E-04	.0927523032
17	366	368.400001	-2.40000034	-.083830445	-.0937252869	.2	1.83008946E-04	-.0927523309
18	436	428	7.99999976	.27943477	.31241757	.2	2.03343204E-03	.309460896
19	408	414.6	-6.60000027	-.230533701	-.257744513	.2	1.38400488E-03	-.255222219
20	469	493.250001	-24.2500004	-.847036683	-.947015801	.2	.0186841443	-.945978199
21	463	444.800001	18.1999997	.635714109	.710749981	.2	.018524282	.707037741
22	474	445	28.9999998	1.01295186	1.13251372	.2	.0267205691	1.13593376
23	460	449.8	10.1999999	.356279339	.398332411	.2	3.3055981E-03	.394814365
24	440	441.6	-1.60000026	-.0558869648	-.0624835261	.2	8.13373132E-05	-.061831745
25	401	404.400001	-3.40000034	-.118759792	-.132777484	.2	3.67288757E-04	-.131411241
26	293	325.2	-32.2000003	-1.12472499	-1.25748077	.2	.0329428725	-1.26532939
27	310	314.6	-4.60000026	-.160675006	-.179640118	.2	6.72303586E-04	-.177818802
28	374	423.600001	-49.6000004	-1.73249564	-1.93698901	.2	.0781651336	-1.99631422
29	374	368.400001	5.59999967	.195604333	.218692292	.2	9.96381641E-04	.216510148
30	419	428	-9.00000025	-.314364134	-.351469786	.2	2.57356272E-03	-.348237767
31	426	414.6	11.3999997	.398194549	.44519504	.2	4.12913801E-03	.441445522
32	506	493.250001	12.7499996	.445349165	.497915503	.2	5.16499684E-03	.493978936
33	415	444.800001	-29.8000003	-1.04089456	-1.1637555	.2	.0282151428	-1.16816716
34	380	445	-65.0000003	-2.27040758	-2.53839284	.2	.134238296	-2.69952876
35	507	449.8	57.1999999	1.99795866	2.23378569	.2	.103954135	2.33509576
36	455	441.6	13.3999997	.468053244	.523299435	.2	5.70504789E-03	.519303153
37	382	404.400001	-22.4000003	-.78241739	-.874769235	.2	.0159421086	-.872592522
38	345	325.2	19.7999997	.691601066	.773233498	.2	.0124560425	.769946861
39	297	314.6	-17.6000003	-.614756521	-.687318685	.2	9.84181197E-03	-.683493154
40	462	423.600001	38.3999996	1.34128692	1.49960437	.2	.0468502761	1.519933
41	363	368.400001	-5.40000034	-.188618487	-.210881879	.2	9.26482644E-04	-.208770365
42	452	428	23.9999998	.838304326	.937252729	.2	.0183008891	.936043054
43	437	414.6	22.3999998	.782417369	.874769212	.2	.0159421078	.872592499
44	491	493.250001	-2.25000036	-.0785910438	-.0878674582	.2	1.60847713E-04	-.0869543482
45	508	444.800001	63.1999997	2.20753474	2.46809887	.2	.1269065	2.61372857
46	497	445	51.9999998	1.81632605	2.03071426	.2	.085912508	2.10176059
47	462	449.8	12.1999999	.426138034	.476436805	.2	4.7290006E-03	.472566509
48	459	441.6	17.3999998	.607770633	.679508225	.2	9.61940474E-03	.675650289
49	409	404.400001	4.59999967	.160674986	.179640095	.2	6.72303412E-04	.177818779
50	315	325.2	-10.2000003	-.356279352	-.398332425	.2	3.30559834E-03	-.394814379
51	325	314.6	10.3999997	.363265202	.406142843	.2	3.43650019E-03	.402582254
52	425	423.600001	1.39999962	.0489010728	.0546730615	.2	6.22738261E-05	.0541022376
53	325	368.400001	-43.4000004	-1.51593368	-1.69486538	.2	.0598451804	-1.7296723
54	405	428	-23.0000002	-.803374995	-.89820055	.2	.0168075881	-.896359794
55	385	414.6	-29.6000003	-1.03390869	-1.15594505	.2	.0278376869	-1.16010183
56	493.25	493.250001	-3.57627869E-07	-1.2491708E-08	-1.39661541E-08	.2	4.06361377E-18	-1.38199077E-08
57	412	444.800001	-32.8000003	-1.1456826	-1.28091209	.2	.0341819954	-1.28973352
58	427	445	-18.0000002	-.628728259	-.702939563	.2	.0102942506	-.699186849
59	403	449.8	-46.8000001	-1.63469345	-1.82764284	.2	.0695891322	-1.87491789
60	425	441.6	-16.6000003	-.579827174	-.648266487	.2	8.75519664E-03	-.644304878

DF FOR T-TEST FOR CASE BEING OUTLIER: 47
T(2,1)= 16581759.2
T(1,1)=-6.82830811E-03
T(1,2)=-2.85058594
STATISTIC FOR DURBIN-WATSON TEST: D= 1.67714587 4-D= 2.32285413
SUM OF SQUARES OF RESIDUALS 39342.3501

Table 7
Periodogram for The Residuals from Table 6B

PERIODOGRAM FROM FILE FORSCOM/RS2

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	529.208233	529.208233	-2.78886096	-3.14046637
.0333333334	6661.11132	7190.31955	-13.6530029	5.96930114
.05	3055.03358	10245.3531	1.98868068	9.89341205
.0666666667	1553.16134	11798.5145	1.81936826	6.96146132
.0833333334	1.13516604E-13	11798.5145	4.17232514E-08	-4.5200189E-08
.1	1348.87319	13147.3877	-6.0704028	2.84827136
.116666667	2182.95038	15330.338	-7.89901546	-3.22033655
.133333333	1234.39861	16564.7367	6.12101838	-1.91826858
.15	307.292134	16872.0288	-3.17457432	.406385326
.166666667	1.44277183E-13	16872.0288	5.61277072E-08	-4.07298406E-08
.183333333	1555.14257	18427.1714	-6.94957805	1.9818742
.2	1130.89339	19558.0647	3.3894043	5.11941255
.216666667	2013.6079	21571.6726	5.26925262	-6.27337551
.233333333	2193.10527	23764.7779	4.01485718	7.54880326
.25	3.29088609E-14	23764.7779	-2.90572643E-08	-1.5894572E-08
.266666667	300.765135	24065.543	-3.11642541	.559818908
.283333333	1250.85051	25316.3936	6.43957241	-.476365513
.3	1335.92265	26652.3162	-6.43376388	-1.77128126
.316666667	1406.38387	28058.7001	-.929326914	6.78349569
.333333333	2.35345077E-13	28058.7001	8.6426735E-08	1.93715096E-08
.35	149.20803	28207.9081	.294966028	2.21056464
.366666667	3411.18996	31619.0981	4.11290878	-9.83820681
.383333333	1495.31914	33114.4172	-4.11594057	5.73611408
.4	1307.00243	34421.4196	5.83976226	3.07634919
.416666667	9.71777272E-13	34421.4196	1.39822563E-07	-1.13323549E-07
.433333333	1862.23518	36283.6548	-3.52059647	7.04839745
.45	1461.45797	37745.1128	3.34926092	6.12353794
.466666667	856.066511	38601.1793	-5.30312766	-.642173941
.483333333	741.17079	39342.3501	4.7155632	1.57135506
.5	3.38657927E-14	39342.3501	-1.73846881E-08	2.87512152E-08

Table 7 (cont'd)
WNT for FORSCOM Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.013451363	0	.258882759	.395408308
2	.182762838	0	.293365517	5.91079885
3	.260415382	0	.327848276	2.44151352
4	.299893485	0	.362331035	1.19191971
5	.299893485	0	.396813793	0
6	.334179012	0	.431296552	1.02957997
7	.389665031	.0169793103	.46577931	1.70362174
8	.421040854	.051462069	.500262069	.939372446
9	.428851575	.0859448276	.534744828	.228294063
10	.428851575	.120427586	.569227586	0
11	.468380036	.154910345	.603710345	1.1935027
12	.497124974	.189393103	.638193104	.858274221
13	.548306662	.223875862	.672675862	1.56433423
14	.604050797	.258358621	.707158621	1.71201469
15	.604050797	.292841379	.741641379	0
16	.611695615	.327324138	.776124138	.223407656
17	.643489611	.361806897	.810606897	.952303406
18	.677445962	.396289655	.845089655	1.0193475
19	.71319329	.430772414	.879572414	1.07510461
20	.71319329	.465255173	.914055172	0
21	.716985845	.499737931	.948537931	.110402807
22	.803691137	.53422069	.98302069	2.75316768
23	.841699012	.568703449	1	1.14577694
24	.874920272	.603186207	1	.996522254
25	.874920272	.637668966	1	0
26	.922254383	.672151724	1	1.4408926
27	.959401579	.706634483	1	1.11883006
28	.981160994	.741117241	1	.645059138
29	1	.7756	1	.556821148
30	1	.810082759	1	0

DF FOR F-RATIOS 2 AND 58

USAREUR TOTAL

The initial ANOVA indicated significant seasonality and a possible weak trend in the data (Table 8). The periodogram confirmed seasonality; surprisingly, however, the raw data passed the WNT (Table 9).

An MLR indicated that trend was insignificant after accounting for seasonality. An MLR using dummy variables alone yielded a significant F-ratio and the residuals passed the WNT. In an attempt to improve the fit, the two worst outliers were replaced (as in FORSCOM), and the MLR was repeated. The resulting F-ratio for regression was 7.69 with 11 and 48 DF (Table 10). The residuals again passed the WNT (Table 11).

Again various efforts to improve the model resulted in indifferent results. The indications are that any systematic variation in this series is mainly seasonal. However, the series also appears to be nearly white noise. In this sense the diagnostic tests yield somewhat conflicting indications.

Table 8
ANOVA Table for Trend and Seasonality in USAREUR Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	9012.06641	2253.0166	2.00844572
MO	11	74964.9825	6814.9984	6.07521239
ERROR	44	49357.9336	1121.77122	
TOTAL	59	133334.982		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	361.666667	MO 1	356.6
YEAR 2	346.333334	MO 2	305
YEAR 3	353.333334	MO 3	283.8
YEAR 4	371.333334	MO 4	428
YEAR 5	335.75	MO 5	351.8
		MO 6	375.4
		MO 7	355
		MO 8	380
		MO 9	333.2
		MO 10	349.6
		MO 11	348.2
		MO 12	377.6

GRAND MEAN 353.683333 STD DEVIATION 47.5385629

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 6.7
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 56.2
PROPORTION OF VARIABILITY DUE RESIDUAL 37

Table 9
Periodogram for USAREUR Total

PERIODOGRAM FROM FILE USAREUR/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	1788.97016	1788.97016	-7.45633039	-2.0088494
.0333333334	9200.566	10989.5362	-.167717445	17.5116363
.05	4751.11631	15740.6525	12.0715517	3.55642858
.0666666667	1389.47874	17130.1312	.830005857	-6.75477966
.0833333334	6445.5263	23575.6575	-12.7053417	-7.30925222
.1	216.78449	23792.442	2.67546473	.260841223
.116666667	453.298137	24245.7401	-.270619679	3.37771878
.133333333	356.825117	24602.5653	-3.32791414	.905073488
.15	2152.93936	26755.5046	7.71316696	-3.50309872
.166666667	14275.8334	41031.338	18.4166665	-11.6913433
.183333333	212.974689	41244.3127	-.417609509	2.63149361
.2	2187.87492	43432.1876	-6.3637758	5.694868
.216666667	2704.8085	46136.9961	.108545101	-9.49465645
.233333333	2387.58702	48524.5831	-8.20861722	-3.49354223
.25	22660.4332	71185.0163	25.9333332	9.10000015
.266666667	266.8235	71451.8398	-1.9359845	-2.26849746
.283333333	1126.48755	72578.3274	-3.32338354	5.14827224
.3	403.049025	72981.3764	2.82453539	2.33601527
.316666667	5790.47784	78771.8542	-7.42705431	-11.741158
.333333333	10538.0326	89309.8868	-11.183334	15.0399732
.35	7745.38092	97055.2677	1.71557426	15.9761125
.366666667	3464.50336	100519.771	-6.16066721	-8.80509086
.383333333	2197.37209	102717.143	8.48825597	-1.0932736
.4	5238.69001	107955.833	5.26377665	-12.1208768
.416666667	6474.73925	114430.572	-12.1279902	-8.2907476
.433333333	1417.50995	115848.082	-1.2129956	6.76601608
.45	167.629931	116015.712	1.23303884	-2.01674976
.466666667	1836.50681	117852.219	-5.71610844	-5.34256473
.483333333	912.345449	118764.565	-1.53513731	5.29668466
.5	7285.20835	126049.773	15.5833334	7.95144741E-07

Table 9 (cont'd)
WNT for USAREUR Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0141925695	0	.258882759	.417510056
2	.0871841012	0	.293365517	2.28342512
3	.124876484	0	.327848276	1.13589364
4	.135899739	0	.362331035	.323237513
5	.18703451	0	.396813793	1.56282296
6	.188754342	0	.431296552	.0499610664
7	.192350526	.0169793103	.46577931	.104665723
8	.195181353	.051462069	.500262069	.0823270409
9	.212261427	.0859448276	.534744828	.503929273
10	.325516953	.120427586	.569227586	3.70389708
11	.327206561	.154910345	.603710345	.0490815562
12	.344563791	.189393103	.638193104	.512250933
13	.366022048	.223875862	.672675862	.635935537
14	.384963669	.258358621	.707158621	.559912661
15	.564737363	.292841379	.741641379	6.35609595
16	.566854173	.327324138	.776124138	.0615177267
17	.57579102	.361806897	.810606897	.261505602
18	.578988559	.396289655	.845089655	.0930260731
19	.624926586	.430772414	.879572414	1.39634826
20	.70852874	.465255173	.914055172	2.64564402
21	.769975744	.499737931	.948537931	1.89862813
22	.797460945	.53422069	.98302069	.819597638
23	.81489352	.568703449	1	.514513974
24	.856454008	.603186207	1	1.25751716
25	.907820536	.637668966	1	1.57028966
26	.919066173	.672151724	1	.329832642
27	.920396044	.706634483	1	.0386176169
28	.934965739	.741117241	1	.428768191
29	.942203717	.7756	1	.211431694
30	1	.810082759	1	1.77890638

DF FOR F-RATIOS 2 AND 58

Table 10
MLR for USAREUR Total
Using Dummy Variables (D1-D11) as Independent Variables
2 Outliers Removed

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	11	63916.9459	5810.63144	7.68733385
ERROR	48	36281.8	755.870833	
TOTAL	59	100198.746		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
D1	3.75833334	11.7718444	-3.88051073E-12	.319264614
D2	-47.8416666	11.7718443	-3.88051073E-12	-4.06407571
D3	-69.0416668	11.7718444	-3.88051073E-12	-5.86498298
D4	47.1583334	11.7718444	-3.88051073E-12	4.0060276
D5	-1.04166668	11.7718443	-3.88051073E-12	-.0884879763
D6	22.5583333	11.7718444	0	1.91629558
D7	2.15833331	11.7718444	0	.183347082
D8	27.1583334	11.7718444	0	2.30705849
D9	-19.6416667	11.7718444	0	-1.66852925
D10	-3.24166666	11.7718444	0	-.275374578
D11	-4.64166667	11.7718443	0	-.394302417

Y-INTERCEPT 352.841667

DF FOR T-TEST ON REGRESSION COEFFS.: 48
STANDARD ERROR OF ESTIMATE: 27.4931052
MEAN OF DEPENDENT VARIABLE: 352.841667
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 7.79191003
PCT OF VARIANCE EXPLAINED BY REGRESSION: 63.7901656
NUMBER OF OBSERVATIONS: 60

Table 10 (cont'd)
Residual Analysis

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I,I)	COOK'S DIST.	T FOR OUTLIER
1	357	356.6	.399999857	.0145490971	.016266385	.2	5.51240172E-06	.0160960961
2	339	305	33.9999998	1.23667369	1.38264321	.2	.0398271303	1.39625172
3	295	283.8	11.1999999	.407374861	.455458941	.2	4.32172598E-03	.451666653
4	413	400.000001	12.9999998	.472845816	.528657693	.2	5.82247827E-03	.524651474
5	358	351.8	6.19999981	.225511079	.252129051	.2	1.32435538E-03	.249654253
6	362	375.4	-13.4000001	-.48739493	-.544924098	.2	6.18629734E-03	-.540893589
7	387	355	31.9999999	1.16392818	1.30131126	.2	.0352793961	1.31101821
8	384	380.000001	3.99999976	.145491014	.162663899	.2	5.512405E-04	.161004947
9	317	333.2	-16.2000002	-.589238649	-.658788837	.2	9.04172359E-03	-.654857578
10	350	349.6	.399999857	.0145490971	.016266385	.2	5.51240172E-06	.0160960961
11	334	348.2	-14.2000002	-.516493137	-.577456882	.2	6.94700937E-03	-.573405244
12	444	395.5	48.4999999	1.76407865	1.97229989	.2	.0810409758	2.03588474
13	349	356.6	-7.60000015	-.276432949	-.309061432	.2	1.98997852E-03	-.306129845
14	268	305	-37.0000003	-1.34579197	-1.50464116	.2	.0471655215	-1.52529033
15	299	283.8	15.1999999	.552865884	.61812285	.2	7.95991369E-03	.614099152
16	377	400.000001	-23.0000002	-.83657339	-.935317484	.2	.0182253916	-.934074391
17	347	351.8	-4.80000019	-.174589234	-.195196698	.2	7.93786477E-04	-.193229404
18	405	375.4	29.5999999	1.07663357	1.20371292	.2	.0301859332	1.20950312
19	340	355	-15.0000001	-.54559134	-.609989662	.2	7.7518206E-03	-.605955358
20	360	380.000001	-20.0000002	-.727455123	-.813319553	.2	.0137810145	-.810406346
21	370	333.2	36.7999998	1.3385174	1.49650795	.2	.0466570011	1.51664085
22	317	349.6	-32.6000002	-1.18575184	-1.32571086	.2	.0366147768	-1.33652515
23	336	348.2	-12.2000002	-.443747626	-.496124928	.2	5.12791549E-03	-.492193344
24	388	395.5	-7.50000012	-.272795672	-.304994833	.2	1.93795517E-03	-.302093947
25	315	356.6	-41.6000002	-1.51310664	-1.69170466	.2	.05962218	-1.72624195
26	320	305	14.9999998	.545591327	.609989648	.2	7.75182021E-03	.605955343
27	328	283.8	44.1999999	1.6076758	1.79743619	.2	.067307851	1.84167346
28	401	400.000001	.999999762	.0363727471	.0406659675	.2	3.4452519E-05	.0402408273
29	359	351.8	7.19999981	.261883834	.292795028	.2	1.78601934E-03	.289988105
30	343	375.4	-32.4000001	-1.17847729	-1.31757766	.2	.0361668937	-1.32801694
31	345	355	-10.0000001	-.363727562	-.406659776	.2	3.44525363E-03	-.403096426
32	412	380.000001	31.9999998	1.16392818	1.30131126	.2	.0352793957	1.3110182
33	332	333.2	-1.20000017	-.0436473129	-.0487991794	.2	4.96116648E-05	-.048289377
34	354	349.6	4.39999986	.16004012	.178930294	.2	6.67001041E-04	.177115704
35	348	348.2	-.200000167	-7.27455722E-03	-8.13320221E-03	.2	1.37810371E-06	-8.048041E-03
36	383	395.5	-12.5000001	-.454659451	-.508324719	.2	5.38320875E-03	-.504361173
37	423	356.6	66.3999999	2.41515098	2.70022088	.2	.15189985	2.90137611
38	316	305	10.9999998	.400100304	.447325739	.2	4.16875659E-03	.443567098
39	275	283.8	-8.80000008	-.320080253	-.357860602	.2	2.66800438E-03	-.354586602
40	400	400.000001	-2.38418579E-07	-8.67194074E-09	-9.69552449E-09	.2	1.9583999E-18	-9.59399788E-09
41	375	351.8	23.1999998	.843847926	.943450662	.2	.0185437323	.94234955
42	409	375.4	33.5999999	1.22212459	1.36637683	.2	.0388955341	1.37915634
43	350	355	-5.00000012	-.181863783	-.203329891	.2	8.61313427E-04	-.201287428
44	414	380.000001	33.9999998	1.23667369	1.38264321	.2	.0398271303	1.39625172
45	316	333.2	-17.2000002	-.625611405	-.699454814	.2	.0101924383	-.695684921
46	374	349.6	24.3999999	.887495235	.992249837	.2	.0205116612	.992086892
47	358	348.2	9.79999983	.356453	.398526569	.2	3.30882137E-03	.395007447
48	395.5	395.5	-1.1920929E-07	-4.33597037E-09	-4.84776224E-09	.2	4.89599974E-19	-4.79699894E-09
49	339	356.6	-17.6000002	-.640160506	-.715721204	.2	.0106720175	-.712036157
50	282	305	-23.0000002	-.83657339	-.935317484	.2	.0182253916	-.934074391
51	222	283.8	-61.8000001	-2.24783631	-2.51315739	.2	.131582501	-2.66860144
52	409	400.000001	8.99999977	.327354793	.365993785	.2	2.79065522E-03	.362667677
53	320	351.8	-31.8000002	-1.15665364	-1.29317808	.2	.0348397823	-1.30252761
54	358	375.4	-17.4000001	-.632885953	-.707588006	.2	.0104308497	-.703859051
55	353	355	-2.00000012	-.0727455158	-.0813319592	.2	1.37810158E-04	-.0804859383
56	330	380.000001	-50.0000003	-1.8186378	-2.03329887	.2	.0861313392	-2.10468757
57	331	333.2	-2.20000017	-.0800200687	-.0894651565	.2	1.66750297E-04	-.0885357048
58	353	349.6	3.39999986	.123667364	.138264317	.2	3.98271275E-04	.136843736
59	365	348.2	16.7999998	.61106229	.683188409	.2	9.72388336E-03	.679345413
60	367	395.5	-28.5000001	-1.03662354	-1.15898035	.2	.0279840721	-1.16323562

DF FOR T-TEST FOR CASE BEING OUTLIER: 47
T(2,1)= 12588725.4
T(1,1)=-3.36837769E-03
T(1,2)=-1.19921875
STATISTIC FOR DURBIN-WATSON TEST: D= 2.09815913 4-D= 1.90184087
SUM OF SQUARES OF RESIDUALS 36281.8

Table 11
Periodogram for Residuals for USAREUR Total from Table 10

PERIODOGRAM FROM FILE USAREUR/RS2

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	548.903437	548.903437	-4.20109661	-.804716394
.0333333334	4120.22341	4669.12684	-.247951457	11.716625
.05	1593.27663	6262.40348	4.99131754	5.30998778
.0666666667	501.136715	6763.54019	4.0852397	.123990893
.0833333334	1.83973207E-15	6763.54019	-6.95387522E-09	-3.60111396E-09
.1	233.449264	6996.98945	-1.06930156	-2.5764775
.116666667	1144.13587	8141.12532	-.350853326	6.16561142
.133333333	405.829854	8546.95517	-3.40814824	-1.38281863
.15	485.744176	9032.69935	3.96840125	-.665780817
.166666667	1.87897846E-13	9032.69935	6.82969889E-08	3.99847826E-08
.183333333	782.744159	9815.44351	2.8376247	-4.24727654
.2	5888.25993	15703.7034	-13.4440107	3.94130787
.216666667	410.645285	16114.3487	.0283107941	-3.69964521
.233333333	1398.12463	17512.4734	-4.95338286	-4.69767524
.25	3.18152912E-14	17512.4734	1.56462193E-08	-2.8560559E-08
.266666667	86.1986293	17598.672	1.31924902	-1.06436351
.283333333	360.086532	17958.7585	-3.40361751	-.646739726
.3	1045.0674	19003.8259	-4.25569846	4.08957341
.316666667	1231.40641	20235.2323	-4.17182047	-4.86238567
.333333333	2.16553627E-14	20235.2323	2.21033891E-08	1.52736902E-08
.35	5302.36575	25537.5981	-2.02919227	13.1387938
.366666667	2442.68188	27980.28	-6.24090294	-6.51719725
.383333333	2463.81376	30444.0937	8.40802248	-3.38116599
.4	2654.75667	33098.8504	1.51901092	-9.28356046
.416666667	2.52339684E-13	33098.8504	-7.87278017E-08	4.70452552E-08
.433333333	125.503372	33224.3538	2.04223711	-.112753335
.45	1452.14678	34676.5006	-5.84719324	-3.77030819
.466666667	1014.06808	35690.5686	-5.79634035	.452446701
.483333333	591.23118	36281.7998	1.72009668	4.09255097
.5	1.08909423E-14	36281.7998	-1.63912773E-08	9.71377575E-09

Table 11 (cont'd)
WNT for USAREUR Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0151288921	0	.258882759	.445477453
2	.128690607	0	.293365517	3.71519347
3	.172604543	0	.327848276	1.33199739
4	.186416887	0	.362331035	.406168122
5	.186416887	0	.396813793	0
6	.192851223	0	.431296552	.187804118
7	.224385928	.0169793103	.46577931	.944284178
8	.235571422	.051462069	.500262069	.328048714
9	.248959517	.0859448276	.534744828	.393523276
10	.248959517	.120427586	.569227586	0
11	.270533534	.154910345	.603710345	.639441816
12	.432825921	.189393103	.638193104	5.61828397
13	.444144138	.223875862	.672675862	.33198578
14	.482679289	.258358621	.707158621	1.16230914
15	.482679289	.292841379	.741641379	0
16	.485055098	.327324138	.776124138	.0690625442
17	.494979814	.361806897	.810606897	.290701876
18	.523783991	.396289655	.845089655	.860095487
19	.55772405	.430772414	.879572414	1.01884123
20	.55772405	.465255173	.914055172	0
21	.703868006	.499737931	.948537931	4.96357056
22	.771193273	.53422069	.98302069	2.09336942
23	.839100978	.568703449	1	2.11279877
24	.912271458	.603186207	1	2.28946516
25	.912271458	.637668966	1	0
26	.915730585	.672151724	1	.100662904
27	.955754696	.706634483	1	1.20909205
28	.983704469	.741117241	1	.83384933
29	1	.7756	1	.480398745
30	1	.810082759	1	0

DF FOR F-RATIOS 2 AND 58

ARNG TOTAL

The initial ANOVA indicated that seasonality in this series is exceptionally strong and that a weak trend might exist (Table 12). The periodogram confirmed the existence of very strong seasonality (Table 13). An MLR showed that trend was of dubious significance. An MLR using dummy variables alone yielded an F-ratio for regression of 77.97 with 11 and 48 DF (Table 14). However, the residual series from this MLR failed the WNT (Table 15). It was found that if the 3 worst outliers were replaced as in FORSCOM, and if the MLR was repeated, then the residuals passed the WNT. However, one of these outliers was late in the series and its replacement value looked inconsistent with other late observations. If, on the other hand, the 4 early outliers, cases 9, 20, 22, and 23, were replaced and the MLR repeated (Table 16), then the residual series failed the WNT. There is a strong indication that this series possesses an additional latent frequency other than seasonality, possibly a 10 month cycle. In any event when the effects of a 10-month cycle were removed from the last residual series (Table 16), the resulting residuals passed the WNT (Table 17).

Table 12
ANOVA for Trend and Seasonality in ARNG Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	8051.8999	2012.97498	2.07695947
MO	11	905840.583	82349.144	84.9666966
ERROR	44	42644.5005	969.193193	
TOTAL	59	956536.984		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	174.833333	MO 1	84.4
YEAR 2	198.75	MO 2	76.8
YEAR 3	174.75	MO 3	56
YEAR 4	165.333333	MO 4	118.4
YEAR 5	169.75	MO 5	102
		MO 6	125.2
		MO 7	148.8
		MO 8	303.4
		MO 9	480.6
		MO 10	314
		MO 11	216.6
		MO 12	94

GRAND MEAN 176.683333 STD DEVIATION 127.328281

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT .8
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 94.7
PROPORTION OF VARIABILITY DUE RESIDUAL 4.4

Table 13
Periodogram for ARNG Total

PERIODOGRAM FROM FILE ARNG/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	5436.59893	5436.59893	-8.60972547	10.3485551
.0333333334	932.099813	6368.69875	-4.73234299	-2.94532232
.05	61.1091986	6429.80795	1.41644364	.175102014
.0666666667	5213.39308	11643.201	-12.2233638	4.93651159
.0833333334	644954.753	656597.954	-.537586977	-146.622654
.1	11209.3617	667807.316	10.1578172	16.445794
.116666667	3691.59529	671498.911	9.52034164	-5.69352892
.133333333	2253.78925	673752.7	8.00865963	3.31476686
.15	1893.39066	675646.091	4.62090917	6.46221484
.166666667	178937.635	854583.726	-74.6333335	-19.8608499
.183333333	532.860845	855116.586	3.98093701	-1.38353487
.2	3024.71116	858141.298	3.23262423	-9.50651597
.216666667	1525.5612	859666.859	6.15747197	-3.59688459
.233333333	160.21175	859827.071	1.29544934	-1.91368824
.25	50266.1661	910093.237	-.033333833	40.9333331
.266666667	486.124237	910579.361	3.33081411	-2.2604908
.283333333	1514.78307	912094.144	-5.48866345	-4.51301923
.3	3799.40468	915893.549	4.64218309	-10.2516808
.316666667	1472.51677	917366.066	-6.10637849	3.43453548
.333333333	5203.03344	922569.099	12.2666668	-4.79200736
.35	738.719457	923307.819	4.09871225	-2.79723788
.366666667	2119.00732	925426.826	-7.30173137	4.16152572
.383333333	132.360127	925559.186	-2.09607819	.135869294
.4	87.1887336	925646.375	1.66737621	-.355172787
.416666667	25144.1806	950790.555	-15.0290782	-24.7440127
.433333333	3124.71387	953915.269	-6.21137395	-8.09789865
.45	418.114209	954333.383	1.56393481	3.38987436
.466666667	132.993433	954466.377	-.466111073	2.05325471
.483333333	735.789444	955202.167	-3.45790479	-3.54530806
.5	667.408334	955869.575	-4.71666667	7.8802521E-08

Table 13 (con't)
WNT for ARNG Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	5.68759491E-03	0	.258882759	.165883732	
2	6.66272776E-03	0	.293365517	.0283064549	
3	6.72665823E-03	0	.327848276	1.85410242E-03	
4	.0121807424	0	.362331035	.159035835	
5	.686911658	0	.396813793	60.1569515	***
6	.698638531	0	.431296552	.344114721	***
7	.70250056	.0169793103	.46577931	.112433036	***
8	.704858401	.051462069	.500262069	.0685390185	***
9	.706839206	.0859448276	.534744828	.0575573364	***
10	.894038003	.120427586	.569227586	6.67908107	***
11	.894595465	.154910345	.603710345	.0161754114	***
12	.89775982	.189393103	.638193104	.0920576136	***
13	.899355814	.223875862	.672675862	.0463577876	***
14	.899523422	.258358621	.707158621	4.86145538E-03	***
15	.952110268	.292841379	.741641379	1.60966578	***
16	.952618835	.327324138	.776124138	.014755964	***
17	.954203552	.361806897	.810606897	.046029743	***
18	.958178368	.396289655	.845089655	.115729641	***
19	.959718867	.430772414	.879572414	.0447434201	***
20	.965162113	.465255173	.914055172	.158718082	***
21	.965934938	.499737931	.948537931	.0224292461	***
22	.968151775	.53422069	.98302069	.0644311149	
23	.968290246	.568703449	1	4.01621184E-03	
24	.96838146	.603186207	1	2.64544831E-03	
25	.994686493	.637668966	1	.783454759	
26	.997955468	.672151724	1	.0951111949	
27	.998392886	.706634483	1	.012690664	
28	.998532019	.741117241	1	4.0354308E-03	
29	.999301779	.7756	1	.022340218	
30	1	.810082759	1	.0202625639	

DF FOR F-RATIOS 2 AND 58

Table 14
MLR on ARNG Total
Using Dummy Variables (D1-D11) as Independent Variables

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	11	905840.585	82349.1441	77.9692237
ERROR	48	50696.3996	1056.17499	
TOTAL	59	956536.985		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
D1	-92.2833334	13.9151745	-3.88051073E-12	-6.6318488
D2	-99.8833334	13.9151745	-3.88051073E-12	-7.17801515
D3	-120.683333	13.9151745	-3.88051073E-12	-8.6727862
D4	-58.2833334	13.9151745	-3.88051073E-12	-4.18847305
D5	-74.6833334	13.9151745	-3.88051073E-12	-5.36704253
D6	-51.4833336	13.9151745	0	-3.69979791
D7	-27.8833334	13.9151745	0	-2.00380767
D8	126.716667	13.9151745	0	9.10636563
D9	303.916667	13.9151745	0	21.8406652
D10	137.316667	13.9151745	0	9.86812394
D11	39.9166666	13.9151745	0	2.86857104

Y-INTERCEPT 176.683333

DF FOR T-TEST ON REGRESSION COEFFS.: 48
STANDARD ERROR OF ESTIMATE: 32.498846
MEAN OF DEPENDENT VARIABLE: 176.683333
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 18.3938379
PCT OF VARIANCE EXPLAINED BY REGRESSION: 94.7000064
NUMBER OF OBSERVATIONS: 60

Table 14 (cont'd)
Residual Analysis for ARNG Total

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I,I)	COOK'S DIST.	T FOR OUTLIER
1	87	84.4	2.60000002	.0800028415	.089445896	.2	1.66678507E-04	.0885166412
2	66	76.8	-10.8	-.332319491	-.371544486	.2	2.87594385E-03	-.36818368
3	48	56	-7.99999994	-.246162585	-.275218137	.2	1.57802131E-03	-.272551323
4	108	118.4	-10.4	-.320011361	-.357783579	.2	2.66685603E-03	-.35451008
5	76	102	-26	-.800028407	-.894458951	.2	.0166678503	-.892562436
6	118	125.2	-7.19999981	-.221546322	-.247696319	.2	1.27819721E-03	-.245259363
7	144	148.8	-4.7999999	-.147697549	-.16513088	.2	5.68087657E-04	-.163448146
8	317	303.4	13.5999998	.418476391	.467870829	.2	4.56048151E-03	.464030834
9	533	480.600001	52.3999993	1.61236492	1.80267878	.2	.0677010585	1.84743455
10	324	314	10.0000001	.307703237	.344022678	.2	2.46565839E-03	.340840705
11	198	216.6	-18.6	-.572328014	-.639882172	.2	8.53019151E-03	-.635899632
12	79	93.9999999	-14.9999999	-.461554847	-.516034006	.2	5.54773116E-03	-.512052701
13	97	84.4	12.6	.387706075	.43346857	.2	3.91447919E-03	.429771498
14	93	76.8	16.2000001	.49847924	.557316733	.2	6.47087377E-03	.553273783
15	64	56	8.00000006	.246162589	.275218141	.2	1.57802136E-03	.272551327
16	122	118.4	3.60000005	.110773166	.123848164	.2	3.1954933E-04	.122570875
17	103	102	1.00000003	.0307703243	.0344022684	.2	2.46565848E-05	.034042445
18	129	125.2	3.80000019	.116927235	.130728623	.2	3.56041099E-04	.129382734
19	144	148.8	-4.7999999	-.147697549	-.16513088	.2	5.68087657E-04	-.163448146
20	375	303.4	71.5999998	2.20315515	2.46320234	.2	.126403453	2.60779197
21	477	480.600001	-3.60000074	-.110773187	-.123848188	.2	3.19549452E-04	-.122570898
22	375	314	61.0000001	1.87698973	2.09853831	.2	.0917471469	2.17892272
23	293	216.6	76.4000001	2.35085271	2.62833323	.2	.14391949	2.81093906
24	113	93.9999999	19.0000001	.584636148	.653643084	.2	8.90102669E-03	.649696411
25	77	84.4	-7.39999998	-.227700392	-.254576778	.2	1.3501945E-03	-.252081216
26	77	76.8	.200000048	6.15406614E-03	6.88045511E-03	.2	9.86263803E-07	6.80840984E-03
27	42	56	-13.9999999	-.430784525	-.481631741	.2	4.83269029E-03	-.477744131
28	82	118.4	-36.4	-1.12003977	-1.25224253	.2	.0326689866	-1.25988007
29	103	102	1.00000003	.0307703243	.0344022684	.2	2.46565848E-05	.034042445
30	121	125.2	-4.19999981	-.129235352	-.144489516	.2	4.34942091E-04	-.143007599
31	141	148.8	-7.7999999	-.240008519	-.268337682	.2	1.50010649E-03	-.26572717
32	312	303.4	8.59999979	.264624774	.295859492	.2	1.92360081E-03	.293028707
33	515	480.600001	34.3999993	1.0584991	1.18343797	.2	.0291776133	1.18851295
34	351	314	37.0000001	1.13850197	1.2728839	.2	.0337548628	1.28136673
35	180	216.6	-36.6	-1.12619384	-1.25912298	.2	.0330289726	-1.26703827
36	96	93.9999999	2.00000012	.0615406504	.0688045389	.2	9.86263451E-05	.0680874103
37	71	84.4	-13.4	-.412322333	-.460990382	.2	4.42733609E-03	-.457176284
38	53	76.8	-23.8	-.732333695	-.818773962	.2	.013966475	-.81591796
39	65	56	9.00000006	.276932912	.309620408	.2	1.99718328E-03	.306684626
40	134	118.4	15.6000001	.480017046	.536675373	.2	6.00042616E-03	.532656067
41	107	102	5.00000003	.153851618	.172011338	.2	6.1641459E-04	.170262607
42	136	125.2	10.8000002	.332319498	.371544494	.2	2.87594398E-03	.368183688
43	167	148.8	18.2000001	.560019889	.62612127	.2	8.16724678E-03	.622110519
44	257	303.4	-46.4000002	-1.42774301	-1.59626521	.2	.0530846381	-1.62322147
45	484	480.600001	3.39999926	.104619077	.116967684	.2	2.8502998E-04	.115759356
46	265	314	-48.9999999	-1.50774584	-1.6857111	.2	.0592004563	-1.71974045
47	164	216.6	-52.6	-1.61851901	-1.80955926	.2	.0682188482	-1.85500105
48	81	93.9999999	-12.9999999	-.4000142	-.447229472	.2	4.1669625E-03	-.44347124
49	90	84.4	5.60000003	.172313812	.192652698	.2	7.7323046E-04	.190709082
50	95	76.8	18.2000001	.560019887	.626121268	.2	8.1672467E-03	.622110517
51	61	56	5.00000006	.153851619	.172011339	.2	6.16414598E-04	.170262608
52	146	118.4	27.6000001	.849260927	.949502581	.2	.018782399	.94850974
53	121	102	19	.584636145	.653643081	.2	8.9010266E-03	.649696408
54	122	125.2	-3.19999981	-.0984650289	-.110087249	.2	2.52483383E-04	-.108948226
55	148	148.8	-.799999893	-.0246162554	-.0275218102	.2	1.57802091E-05	-.0272338307
56	256	303.4	-47.4000002	-1.45851333	-1.63066748	.2	.0553974257	-1.66023345
57	394	480.600001	-86.6000008	-2.66471003	-2.97923638	.2	.18491353	-3.26536272
58	255	314	-58.9999999	-1.81544908	-2.02973377	.2	.0858295662	-2.1006505
59	248	216.6	31.4	.966188155	1.0802312	.2	.0243104049	1.0821543
60	101	93.9999999	7.00000012	.215392267	.240815876	.2	1.20817262E-03	.238438255

DF FOR T-TEST FOR CASE BEING OUTLIER: 47
T(2,1)= 15116973.1
T(1,1)=-1.52897835E-03
T(1,2)=-.874603272
STATISTIC FOR DURBIN-WATSON TEST: D= 1.2585872 4-D= 2.7414128
SUM OF SQUARES OF RESIDUALS 50696.4001

Table 15
Periodogram for ARNG Residuals from Table 14

PERIODOGRAM FROM FILE ARNG/RS4

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	681.340544	681.340544	-4.3350054	1.97966656
.0333333334	525.935806	1207.27635	-2.6330617	3.25548455
.05	976.68565	2183.962	-3.41778425	-4.56891006
.0666666667	766.086131	2950.04813	-3.36544844	3.76961022
.0833333334	7.11181114E-13	2950.04813	9.83476639E-08	1.18464232E-07
.1	5470.09733	8420.14546	5.60641595	12.2843265
.116666667	5479.75094	13899.8964	12.5522416	-5.00994972
.133333333	768.258584	14668.155	3.59559141	3.56094677
.15	1410.64619	16078.8012	6.73385513	1.294888
.166666667	1.57826171E-12	16078.8012	2.09050874E-07	-9.4374021E-08
.183333333	404.219946	16483.0211	3.6079578	-.675750474
.2	2023.06383	18506.085	4.20622578	-7.05288067
.216666667	347.464512	18853.5495	2.14109446	-2.64534778
.233333333	773.97349	19627.523	1.45012134	-4.8678809
.25	4.42347201E-13	19627.523	5.08502126E-08	-1.10268593E-07
.266666667	1536.71678	21164.2397	2.75806188	-6.60431582
.283333333	385.803601	21550.0433	.979693983	-3.44968401
.3	792.886025	22342.9294	1.81441756	-4.81013754
.316666667	-1789.05534	24131.9847	-7.72231567	.0319202542
.333333333	2.00291635E-13	24131.9847	-6.70552254E-08	4.66903051E-08
.35	468.164465	24600.1492	-2.4100647	-3.13002721
.366666667	860.637344	25460.7865	-4.54918638	-2.82715666
.383333333	648.17517	26108.9617	2.4992118	3.91915544
.4	55.2028623	26164.1646	-1.31872564	.317896375
.416666667	1.19895135E-12	26164.1646	1.99613472E-07	-1.09319142E-08
.433333333	1795.50756	27959.6721	-7.11370635	-3.04063052
.45	486.570411	28446.2425	-3.68100613	1.63377096
.466666667	143.309387	28589.5519	.949295262	-1.96870975
.483333333	318.998365	28908.5503	-1.34787864	-2.96925931
.5	1.26611683E-12	28908.5503	1.23865902E-08	2.05062104E-07

Table 15 (cont'd)
WNT for ARNG Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.0235688243	0	.258882759	.69999394	
2	.0417619126	0	.293365517	.53737609	
3	.0755472681	0	.327848276	1.01403484	
4	.102047598	0	.362331035	.789429728	
5	.102047598	0	.396813793	0	
6	.29126834	0	.431296552	6.76805857	
7	.480823018	.0169793103	.46577931	6.78279647	***
8	.507398498	.051462069	.500262069	.791729494	***
9	.556195348	.0859448276	.534744828	1.48770392	***
10	.556195348	.120427586	.569227586	0	
11	.57017806	.154910345	.603710345	.411249036	
12	.640159564	.189393103	.638193104	2.18217554	***
13	.652179002	.223875862	.672675862	.352804198	
14	.67895217	.258358621	.707158621	.797781012	
15	.67895217	.292841379	.741641379	0	
16	.732110034	.327324138	.776124138	1.62812574	
17	.745455691	.361806897	.810606897	.392259015	
18	.77288308	.396289655	.845089655	.817825057	
19	.834769799	.430772414	.879572414	1.91311103	
20	.834769799	.465255173	.914055172	0	
21	.85096447	.499737931	.948537931	.477376419	
22	.880735501	.53422069	.98302069	.889851699	
23	.903157074	.568703449	1	.665139082	
24	.905066643	.603186207	1	.0554834446	
25	.905066643	.637668966	1	0	
26	.967176557	.672151724	1	1.92046757	
27	.984007923	.706634483	1	.496465834	
28	.988965259	.741117241	1	.144478965	
29	1	.7756	1	.323578092	
30	1	.810082759	1	0	

DF FOR F-RATIOS 2 AND 58

Table 16
MLR for ARNG Total with 4 Outliers Removed

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	11	818447.879	74404.3526	123.541612
ERROR	48	28908.5505	602.261468	
TOTAL	59	847356.43		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
D1	-86.8375001	10.5078353	-3.88051073E-12	-8.26407131
D2	-94.4375	10.5078353	-3.88051073E-12	-8.98734111
D3	-115.2375	10.5078353	-3.88051073E-12	-10.9668164
D4	-52.8375	10.5078353	-3.88051073E-12	-5.02839059
D5	-69.2375	10.5078353	-3.88051073E-12	-6.5891307
D6	-46.0375002	10.5078353	0	-4.38125446
D7	-22.4375	10.5078353	0	-2.13531136
D8	114.2625	10.5078353	0	10.8740285
D9	296.2625	10.5078353	0	28.194437
D10	127.5125	10.5078353	0	12.1349923
D11	26.2624999	10.5078353	0	2.49932542

Y-INTERCEPT 171.2375

DF FOR T-TEST ON REGRESSION COEFFS.: 48
STANDARD ERROR OF ESTIMATE: 24.5410161
MEAN OF DEPENDENT VARIABLE: 171.2375
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 14.3315664
PCT OF VARIANCE EXPLAINED BY REGRESSION: 96.5883837
NUMBER OF OBSERVATIONS: 60

Table 16 (cont'd)
Residual Analysis - ARNG Total with 4 Outliers Removed

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I,I)	COOK'S DIST.	T FOR OUTLIER
1	87	84.3999999	2.6000002	.105945092	.118450214	.2	2.92301107E-04	.117226997
2	66	76.7999999	-10.7999999	-.440079573	-.49202392	.2	5.04349038E-03	-.488104126
3	48	55.9999999	-7.99999985	-.325984867	-.364462161	.2	2.76734723E-03	-.361145752
4	108	118.4	-10.3999999	-.423780331	-.473800813	.2	4.67681689E-03	-.46993961
5	76	102	-25.9999999	-1.05945083	-1.18450204	.2	.029230106	-1.18961375
6	118	125.2	-7.19999975	-.293386376	-.32801594	.2	2.24155118E-03	-.324945519
7	144	148.8	-4.79999984	-.195590917	-.218677293	.2	9.96244973E-04	-.216495284
8	317	285.5	31.4999998	1.28356543	1.43506978	.2	.0429046929	1.45152238
9	467.5	467.5	-2.38418579E-07	-9.71510628E-09	-1.0861819E-08	.2	2.45789818E-18	-1.07480796E-08
10	324	298.75	25.2500001	1.02888976	1.15033372	.2	.0275680765	1.15431027
11	198	197.5	.500000238	.0203740643	.0227788963	.2	1.08099608E-05	.0225404891
12	79	93.9999997	-14.9999996	-.611221623	-.683366549	.2	9.72895499E-03	-.679524291
13	97	84.3999999	12.6000002	.513426183	.574027924	.2	6.8647512E-03	.569976738
14	93	76.7999999	16.2000001	.660119374	.738035896	.2	.0113478538	.734486874
15	64	55.9999999	8.00000015	.325984879	.364462175	.2	2.76734743E-03	.361145766
16	122	118.4	3.60000011	.146693198	.164007981	.2	5.6038787E-04	.162336064
17	103	102	1.00000009	.0407481128	.0455577751	.2	4.32398097E-05	.0450816919
18	129	125.2	3.80000025	.154842825	.173119541	.2	6.24382823E-04	.171360227
19	144	148.8	-4.79999984	-.195590917	-.218677293	.2	9.96244973E-04	-.216495284
20	285.5	285.5	-2.38418579E-07	-9.71510628E-09	-1.0861819E-08	.2	2.45789818E-18	-1.07480796E-08
21	477	467.5	9.49999977	.387107027	.432798814	.2	3.90239195E-03	.42910485
22	298.75	298.75	1.1920929E-07	4.85755314E-09	5.43090951E-09	.2	6.14474545E-19	5.37403979E-09
23	197.5	197.5	2.38418579E-07	9.71510628E-09	1.0861819E-08	.2	2.45789817E-18	1.07480796E-08
24	113	93.9999997	19.0000004	.774214088	.865597665	.2	.0156095691	.863297921
25	77	84.3999999	-7.3999998	-.301535999	-.337127496	.2	2.36781143E-03	-.333992919
26	77	76.7999999	.200000137	8.14962742E-03	9.11156044E-03	.2	1.72959445E-06	9.0161566E-03
27	42	55.9999999	-13.9999999	-.570473522	-.637808787	.2	8.47500102E-03	-.633821511
28	82	118.4	-36.3999999	-1.48323117	-1.65830286	.2	.0572910078	-1.69006471
29	103	102	1.00000009	.0407481128	.0455577751	.2	4.32398097E-05	.0450816919
30	121	125.2	-4.19999975	-.171142048	-.191342627	.2	7.62750017E-04	-.189411234
31	141	148.8	-7.79999984	-.317835245	-.355350606	.2	2.63070945E-03	-.352092987
32	312	285.5	26.4999998	1.07982488	1.20728092	.2	.0303651505	1.21320038
33	515	467.5	47.4999998	1.93553518	2.16399411	.2	.0975598025	2.25411033
34	351	298.75	52.2500001	2.12908871	2.38039354	.2	.118047363	2.50815541
35	180	197.5	-17.4999998	-.7130919	-.797260981	.2	.013242189	-.794188389
36	96	93.9999997	2.00000036	.0814962329	.0911155583	.2	1.7295927E-04	.0901692405
37	71	84.3999999	-13.3999998	-.546024654	-.610474122	.2	7.76413862E-03	-.606440378
38	53	76.7999999	-23.7999999	-.969804992	-1.08427494	.2	.0244927532	-1.08630676
39	65	55.9999999	9.00000015	.366732988	.410019946	.2	3.50242408E-03	.40643881
40	134	118.4	15.6000001	.635670507	.710701233	.2	.0105228384	.706988732
41	107	102	5.00000009	.203740549	.227788859	.2	1.08099509E-03	.225525499
42	136	125.2	10.8000003	.440079589	.492023938	.2	5.04349074E-03	.488104143
43	167	148.8	18.2000002	.741615593	.82915144	.2	.0143227523	.826408554
44	257	285.5	-28.5000002	-1.16132112	-1.29839648	.2	.0351215298	-1.30797467
45	484	467.5	16.4999998	.672343791	.751703211	.2	.0117720358	.748249002
46	265	298.75	-33.7499999	-1.37524868	-1.53757477	.2	.0492528366	-1.56038596
47	164	197.5	-33.4999998	-1.36506165	-1.52618532	.2	.0485258669	-1.54823574
48	81	93.9999997	-12.9999996	-.529725404	-.592251007	.2	7.30752614E-03	-.588202347
49	90	84.3999999	5.6000002	.228189419	.255123527	.2	1.35600029E-03	.25262334
50	95	76.7999999	18.2000001	.741615592	.829151438	.2	.0143227522	.826408552
51	61	55.9999999	5.00000015	.203740552	.227788862	.2	1.08099512E-03	.225525501
52	146	118.4	27.6000001	1.12464782	1.25739448	.2	.0329383519	1.26523961
53	121	102	19.0000001	.774214077	.865597653	.2	.0156095687	.863297908
54	122	125.2	-3.19999975	-.130393939	-.145784856	.2	4.42775504E-04	-.144290218
55	148	148.8	-.799999833	-.0325984805	-.0364462092	.2	2.76734618E-05	-.036065062
56	256	285.5	-29.5000002	-1.20206923	-1.34395426	.2	.0376294383	-1.35563144
57	394	467.5	-73.5000003	-2.99498603	-3.34849618	.2	.233592222	-3.78484559
58	255	298.75	-43.7499999	-1.78272977	-1.99315248	.2	.0827636831	-2.05934075
59	248	197.5	50.5000003	2.05777952	2.30066744	.2	.110272306	2.41353501
60	101	93.9999997	7.00000036	.285236779	.318904413	.2	2.11875051E-03	.315899842

DF FOR T-TEST FOR CASE BEING OUTLIER: 47
T(2,1)= 8142921.76
T(1,1)= 2.90393829E-04
T(1,2)=-.170654297
STATISTIC FOR DURBIN-WATSON TEST: D= 1.41452235 4-D= 2.58547766
SUM OF SQUARES OF RESIDUALS 28908.55

Table 17
Periodogram for ARNG Residuals
After Removing a 10-Month and 12-Month Cycle

PERIODOGRAM FROM FILE ARNG/RS5

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	681.340544	681.340544	-4.3350054	1.97966656
.0333333334	525.935807	1207.27635	-2.6330617	3.25548455
.05	976.685652	2183.96201	-3.41778426	-4.56891006
.0666666667	766.086131	2950.04814	-3.36544843	3.76961022
.0833333334	6.81540472E-13	2950.04814	9.474655E-08	1.17222468E-07
.1	1.38551457E-14	2950.04814	-8.07146232E-09	-1.99170702E-08
.116666667	5479.75093	8429.79906	12.5522416	-5.00994973
.133333333	768.258583	9198.05765	3.59559141	3.56094677
.15	1410.64619	10608.7038	6.7338551	1.294888
.166666667	1.46327606E-12	10608.7038	2.11503357E-07	-6.35782878E-08
.183333333	404.219944	11012.9238	3.60795779	-.675750484
.2	1.62122734E-13	11012.9238	7.28915136E-08	-9.53511272E-09
.216666667	347.464509	11360.3883	2.14109442	-2.6453478
.233333333	773.973483	12134.3618	1.45012129	-4.86788089
.25	3.84435077E-13	12134.3618	2.95539697E-08	-1.09275182E-07
.266666667	1536.71677	13671.0785	2.75806187	-6.60431578
.283333333	385.803595	14056.8821	.979694035	-3.44968396
.3	5.60125587E-13	14056.8821	1.35879964E-07	-1.44044558E-08
.316666667	1789.05534	15845.9375	-7.72231565	.0319202478
.333333333	7.70943495E-14	15845.9375	-1.97440386E-08	4.66903051E-08
.35	468.164477	16314.1019	-2.4100647	-3.13002727
.366666667	860.637354	17174.7393	-4.54918644	-2.82715662
.383333333	648.175181	17822.9145	2.49921181	3.91915548
.4	8.94824496E-14	17822.9145	5.00741104E-08	-2.1802105E-08
.416666667	7.86244093E-13	17822.9145	1.61832819E-07	4.2749271E-09
.433333333	1795.50758	19618.4221	-7.11370639	-3.04063052
.45	486.570412	20104.9925	-3.68100615	1.63377094
.466666667	143.309388	20248.3019	.949295293	-1.96870974
.483333333	318.99836	20567.3002	-1.34787862	-2.96925949
.5	3.53191391E-13	20567.3002	-4.76526718E-09	1.08398979E-07

Table 17 (cont'd)
WNT for ARNG Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.033127369	0	.258882759	.993609366
2	.0586988248	0	.293365517	.761032937
3	.10618613	0	.327848276	1.44578843
4	.143433903	0	.362331035	1.12197655
5	.143433903	0	.396813793	0
6	.143433903	0	.431296552	0
7	.409864152	.0169793103	.46577931	10.5327097
8	.447217552	.051462069	.500262069	1.12528168
9	.515804394	.0859448276	.534744828	2.13548458
10	.515804394	.120427586	.569227586	0
11	.535457919	.154910345	.603710345	.581378352
12	.535457919	.189393103	.638193104	0
13	.552351945	.223875862	.672675862	.498345827
14	.589983208	.258358621	.707158621	1.13397972
15	.589983208	.292841379	.741641379	0
16	.664699712	.327324138	.776124138	2.34174566
17	.683457818	.361806897	.810606897	.554384272
18	.683457818	.396289655	.845089655	0
19	.770443243	.430772414	.879572414	2.76291023
20	.770443243	.465255173	.914055172	0
21	.793205806	.499737931	.948537931	.675490233
22	.835050742	.53422069	.98302069	1.26649974
23	.866565582	.568703449	1	.943669973
24	.866565582	.603186207	1	0
25	.866565582	.637668966	1	0
26	.95386472	.672151724	1	2.77382777
27	.977522196	.706634483	1	.702690693
28	.984490023	.741117241	1	.203484827
29	1	.7756	1	.45687547
30	1	.810082759	1	0

DF FOR F-RATIOS 2 AND 58

TRADOC TOTAL

The initial ANOVA indicated trend and seasonality with trend having the highest F-ratio (Table 18). The periodogram confirmed seasonality and indicated a trend in the series (Table 19). AN MLR using time and dummy variables as independent variables yielded an F-ratio for regression of 9.94 with 12 and 47 DF. The regression coefficient for time was very significant (Table 20). The residual series passed the WNT (Table 21). This series possesses both trend and seasonality.

Table 18
ANOVA for Trend and Seasonality in TRADOC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	9038.09961	2259.5249	11.7418111
MO	11	23368.9829	2124.45299	11.0398986
ERROR	44	8467.10059	192.434104	
TOTAL	59	40874.1831		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	164.666667	MO 1	157.8
YEAR 2	150.583333	MO 2	134.2
YEAR 3	148.916667	MO 3	94.8
YEAR 4	155.333333	MO 4	158.4
YEAR 5	127.416667	MO 5	144.6
		MO 6	155.8
		MO 7	140.2
		MO 8	166.6
		MO 9	169.2
		MO 10	166.6
		MO 11	161.2
		MO 12	143.2

GRAND MEAN 149.383333 STD DEVIATION 26.3207668

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 22.1
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 57.1
PROPORTION OF VARIABILITY DUE RESIDUAL 20.7

Table 19
Periodogram for TRADOC Total

PERIODOGRAM FROM FILE TRADOC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	1932.82254	1932.82254	-3.38793907	7.27662607
.0333333334	5634.33825	7567.16079	-4.0307875	13.0982452
.05	1781.80502	9348.96582	1.86784268	7.4769422
.0666666667	218.635078	9567.60089	2.63927795	.567492606
.0833333334	9932.00725	19499.6081	.819678202	-18.1767719
.1	384.839305	19884.4474	2.38642289	2.67076068
.116666667	182.222681	20066.6701	2.41541623	-.489748711
.133333333	245.95597	20312.6261	-2.69943152	-.954778415
.15	148.388418	20461.0145	2.16614825	-.504065835
.166666667	1120.00003	21581.0145	3.99999991	-4.61880234
.183333333	398.195344	21979.2099	3.35833732	1.41235569
.2	1577.63032	23556.8402	-6.84959306	2.38133416
.216666667	458.348125	24015.1883	3.76250651	1.05915799
.233333333	143.314116	24158.5024	-1.57888682	1.51137474
.25	4849.76664	29008.2691	1.93333323	12.5666666
.266666667	60.6782474	29068.9473	-.865013168	1.12887575
.283333333	1050.88766	30119.835	1.30255929	5.77346758
.3	1217.32756	31337.1625	-1.30308958	6.23534627
.316666667	470.023892	31807.1864	3.55362582	-1.74333204
.333333333	2404.13331	34211.3198	-8.63333344	2.3671356
.35	61.9268309	34273.2466	1.2305751	-.741560941
.366666667	473.713733	34746.9603	-1.56292968	3.6534516
.383333333	218.06782	34965.0281	-1.3684597	-2.322982
.4	104.136128	35069.1643	-.700406589	-1.72645153
.416666667	3709.32574	38778.49	-9.05301088	-6.45656142
.433333333	133.967145	38912.4572	-.660728431	-2.00723926
.45	538.613232	39451.0704	-2.19789991	-3.62256958
.466666667	24.2640101	39475.3344	.225166005	.870689731
.483333333	45.0988383	39520.4332	1.09728702	.547042784
.5	676.875	40197.3082	4.75	1.94080465E-07

Table 19 (cont'd)
WNT for TRADOC Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.0480833824	0	.258882759	1.46485318	
2	.188250436	0	.293365517	4.72748174	
3	.232576912	0	.327848276	1.34509095	
4	.23801596	0	.362331035	.15859499	
5	.485097361	0	.396813793	9.51677997	***
6	.494671119	0	.431296552	.280322725	***
7	.499204325	.0169793103	.46577931	.132061637	***
8	.505323042	.051462069	.500262069	.178535212	***
9	.509014544	.0859448276	.534744828	.107450194	
10	.536877107	.120427586	.569227586	.831172933	
11	.546783127	.154910345	.603710345	.290148803	
12	.58603029	.189393103	.638193104	1.18466237	
13	.597432748	.223875862	.672675862	.334485238	
14	.600998015	.258358621	.707158621	.103762671	
15	.721647055	.292841379	.741641379	3.97886886	
16	.723156565	.327324138	.776124138	.0438419748	
17	.749299799	.361806897	.810606897	.778506479	
18	.779583607	.396289655	.845089655	.905657177	
19	.791276527	.430772414	.879572414	.343106588	
20	.851084843	.465255173	.914055172	1.84477399	
21	.852625414	.499737931	.948537931	.044745512	
22	.864410127	.53422069	.98302069	.345832202	
23	.869835063	.568703449	1	.158181268	
24	.872425687	.603186207	1	.075323239	
25	.964703651	.637668966	1	2.94810618	
26	.96803639	.672151724	1	.0969726234	
27	.981435627	.706634483	1	.393855215	
28	.982039249	.741117241	1	.017515631	
29	.983161186	.7756	1	.0325727058	
30	1	.810082759	1	.496689267	

DF FOR F-RATIOS 2 AND 58

Table 20
MLR Using Time and Dummy Varibles (D1-D11) as Independent Variables

ANOVA TABLE FOR REGRESSION-DEPENDENT VARIABLE: ACCDT

SOURCE	DF	SS	MSS	F RATIO
REGRESSION	12	29765.3918	2480.44932	9.93973819
ERROR	47	11728.7916	249.548758	
TOTAL	59	41494.1835		

PARTIAL REGRESSION COEFFICIENTS

VAR. #	COEFFICIENT. B	STD ERROR	MEAN	T (FOR B=0)
TIME	-.615972228	.120172705	30.5	-5.12572491
D1	4.19548614	6.7961357	-3.88051073E-12	.617334074
D2	-18.7885417	6.7855026	-3.88051073E-12	-2.76892411
D3	-57.5725695	6.77698412	-3.88051073E-12	-8.49530831
D4	6.6434028	6.77058823	-3.88051073E-12	.98121501
D5	-6.54062499	6.76632095	-3.88051073E-12	-.966644214
D6	5.27534722	6.76418628	0	.779893841
D7	-9.70868056	6.76418629	0	-1.4353065
D8	17.3072917	6.76632095	0	2.55785853
D9	20.523264	6.77058823	0	3.03123795
D10	18.5392361	6.77698412	0	2.73561747
D11	13.7552083	6.78550259	0	2.02714657

Y-INTERCEPT 169.00382

DF FOR T-TEST ON REGRESSION COEFFS.: 47
STANDARD ERROR OF ESTIMATE: 15.7971123
MEAN OF DEPENDENT VARIABLE: 150.216667
STD. ERROR OF EST. AS PCT OF MEAN OF DEP. VAR.: 10.5162181
PCT OF VARIANCE EXPLAINED BY REGRESSION: 71.7338898
NUMBER OF OBSERVATIONS: 60

Table 20 (cont'd)
Residual Analysis

CASE	Y. OBSERVED	Y. COMPUTED	RESIDUAL	NORMAL DEV.	STUD. RES.	V(I.I)	COOK'S DIST.	T FOR OUTLIER
1	181	172.583334	8.41666633	.532797777	.608497942	.233333333	8.66852245E-03	.60437512
2	144	148.983334	-4.98333359	-.315458515	-.360279812	.233333333	3.03881861E-03	-.356918846
3	90	109.583334	-19.5833336	-1.23967806	-1.41581212	.233333333	.0469286543	-1.43152888
4	183	173.183334	9.81666637	.621421571	.709713447	.233333333	.011792148	.705915505
5	152	159.383334	-7.38333363	-.467385018	-.533791306	.233333333	6.67067595E-03	-.529690184
6	176	170.583334	5.41666639	.342889655	.391607582	.233333333	3.5902859E-03	.388052751
7	158	154.983334	3.01666641	.190963155	.218095292	.233333334	1.1135749E-03	.215871918
8	184	181.383334	2.61666632	.165642066	.18917657	.233333334	8.37840879E-04	.187224527
9	180	183.983334	-3.98333365	-.25215581	-.287982228	.233333334	1.94159314E-03	-.285153811
10	172	181.383334	-9.38333362	-.593990435	-.678384882	.233333333	.0107740546	-.674439269
11	186	175.983334	10.0166664	.634082116	.724172808	.233333333	.0122775377	.720458135
12	170	167.983334	2.01666647	.12766045	.145798508	.233333333	4.97660318E-04	.144271751
13	161	165.191667	-4.19166696	-.265343873	-.298220768	.208333333	1.80031632E-03	-.295310682
14	138	141.591667	-3.59166688	-.227362242	-.2555331	.208333333	1.32180496E-03	-.252975838
15	106	102.191667	3.80833319	.241077806	.270948064	.208333333	1.48609814E-03	.26825973
16	138	165.791667	-27.7916669	-1.7592878	-1.97726879	.208333333	.0791415354	-2.04293393
17	157	151.991667	5.00833309	.317041051	.35632338	.208333334	2.57016905E-03	.352989432
18	169	163.191667	5.8083331	.367683218	.413240262	.208333333	3.45683227E-03	.409565178
19	143	147.591667	-4.59166688	-.290664951	-.326679203	.208333334	2.16030975E-03	-.323552749
20	158	173.991667	-15.9916669	-1.01231583	-1.13774477	.208333334	.026203708	-1.14140392
21	163	176.591667	-13.5916669	-.860389333	-.96699413	.208333334	.0109286973	-.966312465
22	182	173.991667	8.00833315	.50694918	.569761692	.208333333	6.57142479E-03	.565624574
23	161	168.591667	-7.59166682	-.480573073	-.540117586	.208333333	5.90540323E-03	-.536006757
24	181	160.591667	20.4083332	1.29190277	1.45197337	.208333333	.0426766529	1.46978627
25	154	157.8	-3.80000019	-.240550305	-.268943417	.2	1.39097234E-03	-.266271903
26	128	134.2	-6.20000011	-.392476801	-.438802403	.2	3.70283747E-03	-.435001156
27	99	94.8000001	4.19999993	.265871372	.297253231	.2	1.69922083E-03	.294350779
28	185	158.4	26.5999999	1.68385204	1.88260382	.2	.068157637	1.93693816
29	130	144.6	-14.6000002	-.924219556	-1.03330888	.2	.0205332161	-1.0340704
30	127	155.8	-28.8000001	-1.82311802	-2.03830791	.2	.0798980603	-2.11201553
31	146	140.2	5.79999984	.3671557	.410492552	.2	3.24046414E-03	.406832072
32	181	166.6	14.3999998	.911558993	1.01915394	.2	.0199745144	1.01958264
33	182	169.2	12.7999998	.810274661	.905914611	.2	.0157823324	.904154024
34	170	166.6	3.39999986	.215229201	.240633562	.2	1.11354829E-03	.238206648
35	151	161.2	-10.2000001	-.645687636	-.721900722	.2	.0100219356	-.718172319
36	134	153.2	-19.2000001	-1.21541201	-1.35887194	.2	.0355102491	-1.37155079
37	168	150.408334	17.5916665	1.11360014	1.25157851	.208333333	.0317094892	1.25935645
38	132	126.808333	5.19166663	.328646561	.369366847	.208333333	2.76177869E-03	.365947809
39	100	87.4083333	12.5916667	.797086607	.895848008	.208333333	.0162458229	.89393145
40	158	151.008333	6.99166656	.442591431	.497429826	.208333333	5.00883465E-03	.493410087
41	170	137.208333	32.7916666	2.07580132	2.33299927	.208333333	.110179871	2.45454403
42	174	148.408333	25.5916666	1.62002181	1.82074734	.208333333	.0671077097	1.86837062
43	156	132.808333	23.1916666	1.46809532	1.64999669	.208333334	.0551111151	1.68178467
44	184	159.208333	24.7916666	1.56937965	1.76383045	.208333334	.0629776897	1.8057532
45	155	161.808333	-6.80833346	-.43098595	-.48438639	.208333334	4.7495987E-03	-.480406264
46	162	159.208333	2.79166663	.176720059	.1986162	.208333333	7.98550504E-04	.196574414
47	166	153.808333	12.1916667	.771765523	.867389567	.208333333	.0152300538	.865064209
48	139	145.808333	-6.80833334	-.430985942	-.484386382	.208333333	4.74959852E-03	-.480406256
49	125	143.016667	-18.0166667	-1.14050381	-1.30254713	.233333333	.0397204122	-1.31252355
50	129	119.416667	9.58333335	.606650959	.692844219	.233333333	.0112382334	.68896128
51	79	80.0166666	-1.01666662	-.064357751	-.0735017312	.233333333	1.26400038E-04	-.0727197734
52	128	143.616667	-15.6166667	-.988577302	-1.12903484	.233333333	.0298429354	-1.13242141
53	114	129.816667	-15.8166667	-1.00123784	-1.1434942	.233333333	.0306122169	-1.14733646
54	133	141.016667	-8.01666665	-.507476714	-.579579249	.233333333	7.86416302E-03	-.575440406
55	98	125.416667	-27.4166667	-1.73554926	-1.98213694	.233333334	.0919801603	-2.04842196
56	126	151.816667	-25.8166667	-1.63426493	-1.86646208	.233333334	.0815577423	-1.9189869
57	166	154.416667	11.5833333	.733256375	.837437793	.233333334	.0164184428	.83473204
58	147	151.816667	-4.81666666	-.304908047	-.348229529	.233333333	2.83895194E-03	-.344950329
59	142	146.416667	-4.41666663	-.279586961	-.319310811	.233333333	2.38700922E-03	-.316238826
60	142	138.416667	3.58333337	.226834709	.259063493	.233333333	1.57122827E-03	.256475865

DF FOR T-TEST FOR CASE BEING OUTLIER: 46
T(2.1)= 1745141.65
T(1.1)=-1.3436079E-03
T(1.2)= 27888.5997
STATISTIC FOR DURBIN-WATSON TEST: D= 1.54449331 4-D= 2.45550669
SUM OF SQUARES OF RESIDUALS 11728.7917

Table 21
Periodogram for TRADOC Residuals from Table 20

PERIODOGRAM FROM FILE TRADOC/RES

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	876.221731	876.221731	-4.12032857	-3.49718223
.0333333334	1210.80824	2087.02997	-2.89978693	5.65256671
.05	1072.5713	3159.60127	2.99884321	5.17294078
.0666666667	437.783804	3597.38508	1.90688844	-3.31007099
.0833333334	1.34594303E-15	3597.38508	4.59452471E-09	4.87392147E-09
.1	174.437122	3771.8222	1.65403331	1.75463516
.116666667	783.474994	4555.29719	3.54641693	-3.67950541
.133333333	90.8176924	4646.11489	-1.568431	-.753180337
.15	279.176302	4925.29119	1.43375893	-2.69262179
.166666667	4.92872525E-14	4925.29119	3.75322998E-08	-1.53047343E-08
.183333333	269.377449	5194.66864	2.62594795	1.44348386
.2	981.148933	6175.81757	-5.71859289	-.0515733168
.216666667	824.829654	7000.64723	4.89350703	1.88358986
.233333333	160.956454	7161.60368	-2.31127614	-.152373707
.25	6.38558939E-14	7161.60368	-4.19095159E-09	-4.5945247E-08
.266666667	148.98848	7310.59216	-1.59740275	1.55389418
.283333333	586.053883	7896.64604	2.43355974	3.68956859
.3	1631.68249	9528.32853	-.172088938	7.37291
.316666667	531.373321	10059.7019	2.8212364	-3.12299043
.333333333	7.85470358E-14	10059.7019	3.99226944E-08	-3.20064525E-08
.35	7.61790452	10067.3198	.498185416	-.0757723055
.366666667	102.161745	10169.4815	-.43192963	1.79410934
.383333333	30.1716041	10199.6531	-.237458947	-.974337408
.4	314.973341	10514.6264	-1.43279596	-2.9062359
.416666667	1.35453399E-14	10514.6264	-6.82969889E-10	2.12378173E-08
.433333333	98.4888216	10613.1153	-1.39311838	-1.15852575
.45	878.510171	11491.6254	-1.0668986	-5.30522382
.466666667	226.688263	11718.3137	1.35616753	2.39104268
.483333333	10.4779412	11728.7916	.364897331	-.464881322
.5	1.28257903E-14	11728.7916	2.09547579E-09	2.05702534E-08

Table 21 (cont'd)
WNT for TRADOC Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0747069057	0	.258882759	2.34142055
2	.177940749	0	.293365517	3.33841931
3	.269388473	0	.327848276	2.91891185
4	.306714041	0	.362331035	1.12441073
5	.306714041	0	.396813793	0
6	.321586598	0	.431296552	.437815588
7	.388385891	.0169793103	.46577931	2.07584445
8	.396129033	.051462069	.500262069	.226303399
9	.419931681	.0859448276	.534744828	.707107839
10	.419931681	.120427586	.569227586	0
11	.442898876	.154910345	.603710345	.68170553
12	.526551904	.189393103	.638193104	2.64740091
13	.596877107	.223875862	.672675862	2.19370353
14	.610600298	.258358621	.707158621	.403509997
15	.610600298	.292841379	.741641379	0
16	.623303097	.327324138	.776124138	.373120842
17	.673270212	.361806897	.810606897	1.52525914
18	.81238791	.396289655	.845089655	4.68637028
19	.857692946	.430772414	.879572414	1.37619457
20	.857692946	.465255173	.914055172	0
21	.85834245	.499737931	.948537931	.0188478765
22	.867052789	.53422069	.98302069	.254819384
23	.869625228	.568703449	1	.0747931395
24	.896479942	.603186207	1	.800277926
25	.896479942	.637668966	1	0
26	.904877126	.672151724	1	.245580524
27	.979779144	.706634483	1	2.34803079
28	.999106648	.741117241	1	.571544126
29	1	.7756	1	.0259303733
30	1	.810082759	1	0

DF FOR F-RATIOS 2 AND 58

USAISC TOTAL

The initial ANOVA indicated the possible existence of a weak trend and insignificant seasonality (Table 22). The periodogram was undefinitive, and the raw data passed the WNT (Table 23). We attempted to fit this series with numerous models, but none were satisfactory. This series definitely appears to be purely white noise (apart from a non-zero mean).

It is interesting to note that when this series was fitted with a purely seasonal model, the residual series failed the WNT. This is an example of a type of the Slutzsky-Yule effect, Kendall (9, p. 40). If the terms of a series $[Y_t]$ are linear combinations of the terms of a white noise series, then $[Y_t]$ itself is generally not white noise, but may be smoother than the original white noise series. A great deal of the modern theory of time series is based on the fact that many series can be obtained by transformations of a white noise series.

Table 22
ANOVA for Trend and Seasonality in USAISC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	186.566666	46.6416664	2.62624236
MO	11	329.400002	29.9454547	1.68613233
ERROR	44	781.433335	17.7598485	
TOTAL	59	1297.4		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	21.5	MO 1	21.8
YEAR 2	21.75	MO 2	23.2
YEAR 3	20.25	MO 3	15.6
YEAR 4	23.6666667	MO 4	22.8
YEAR 5	18.3333333	MO 5	18.6
		MO 6	24.6
		MO 7	21.6
		MO 8	20.6
		MO 9	22.2
		MO 10	18.8
		MO 11	20.8
		MO 12	22.6

GRAND MEAN 21..1 STD DEVIATION 4.68933157

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 14.3
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 25.3
PROPORTION OF VARIABILITY DUE RESIDUAL 60.2

Table 23
Periodogram for USAISC Total

PERIODOGRAM FROM FILE USAISC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	22.9229066	22.9229066	-.872861136	.0470140954
.0333333334	236.394518	259.317424	-2.73985498	.610747046
.05	125.002176	384.319601	-.934094048	1.81499518
.0666666667	60.8695894	445.18919	1.26675223	.651402411
.0833333334	3.28053509	448.469725	-.103589838	-.314038716
.1	62.2914222	510.761147	.750000024	-1.2303986
.116666667	6.31920935	517.080356	-.0987226082	-.448212182
.133333333	4.25579228	521.336149	.373422108	-.0491494857
.15	10.4764017	531.812551	-.498836318	.316821269
.166666667	78.6999978	610.512548	1.34999999	.894892896
.183333333	33.5342323	644.046781	1.04705987	.146537943
.2	75.272665	719.319446	-.273606749	1.56020133
.216666667	7.40489741	726.724343	-.496590653	.0150876393
.233333333	2.78058605	729.504929	.0953853885	.289115599
.25	17.9333333	747.438262	-.100000005	.766666665
.266666667	5.9761254	753.414388	-.269538605	.355743054
.283333333	7.62411867	761.038506	-.190025885	-.466934098
.3	60.8752402	821.913746	.749999991	-1.21106345
.316666667	32.6496296	854.563376	-.0821565111	-1.0399862
.333333333	2.69999872	857.263375	.150000002	.259807538
.35	72.4150108	929.678385	.491405917	1.47389074
.366666667	13.4288775	943.107263	.657231242	.125205215
.383333333	12.6592808	955.766544	.474464485	-.443688495
.4	.960669845	956.727214	.173606772	-.0433937413
.416666667	166.786126	1123.51334	-.79641005	-2.21929461
.433333333	32.5293475	1156.04269	-.612761543	.84192332
.45	75.5064211	1231.54911	-1.45847561	-.624283256
.466666667	2.36516114	1233.91427	-.270635801	-.0747995205
.483333333	3.48572753	1237.4	.11883241	.319483608
.5	30.0000001	1267.4	1	5.53958313E-08

Table 23 (cont'd)
WNT for USAISC Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0180865604	0	.258882759	.534171579
2	.204605827	0	.293365517	6.649277
3	.303234655	0	.327848276	3.17320556
4	.351261789	0	.362331035	1.46305314
5	.353850187	0	.396813793	.0752583288
6	.402999171	0	.431296552	1.4989946
7	.407985133	.0169793103	.46577931	.145317471
8	.411343026	.051462069	.500262069	.0977069591
9	.419609083	.0859448276	.534744828	.241713694
10	.48170471	.120427586	.569227586	1.91999658
11	.508163786	.154910345	.603710345	.788167374
12	.56755519	.189393103	.638193104	1.83110246
13	.573397779	.223875862	.672675862	.170430842
14	.575591708	.258358621	.707158621	.0637638435
15	.589741411	.292841379	.741641379	.416230923
16	.594456675	.327324138	.776124138	.137390486
17	.600472233	.361806897	.810606897	.175506963
18	.648503826	.396289655	.845089655	1.46319581
19	.674264935	.430772414	.879572414	.766826465
20	.676395279	.465255173	.914055172	.0619118843
21	.733531946	.499737931	.948537931	1.75737381
22	.744127557	.53422069	.98302069	.310563333
23	.754115944	.568703449	1	.292585662
24	.754873928	.603186207	1	.0219982295
25	.886470998	.637668966	1	4.39463628
26	.912137203	.672151724	1	.763927037
27	.971713044	.706634483	1	1.8371491
28	.973579196	.741117241	1	.0542195878
29	.976329493	.7756	1	.0799785986
30	1	.810082759	1	.703087121

DF FOR F-RATIOS 2 AND 58

JAPAN TOTAL

The initial ANOVA indicated that trend and seasonality are insignificant (Table 24). The periodogram did not indicate the presence of significant latent frequencies and the raw data passed the WNT (Table 25).

The number of accidents reported by this command is quite small. The series does not appear to have any significant systematic variation. The sample variance of the series is also quite small.

Table 24
ANOVA for Trend and Seasonality in JAPAN Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	3.56666666	.891666666	.9333862
MO	11	11.3833333	1.03484848	1.08326725
ERROR	44	42.0333334	.955303031	
TOTAL	59	56.9833334		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	1.75	MO 1	2.2
YEAR 2	1.08333333	MO 2	1.4
YEAR 3	1.66666667	MO 3	2.2
YEAR 4	1.58333333	MO 4	1.8
YEAR 5	1.33333333	MO 5	1
		MO 6	1.4
		MO 7	.6
		MO 8	1.6
		MO 9	1.4
		MO 10	1.4
		MO 11	1.2
		MO 12	1.6

GRAND MEAN 1.48333333 STD DEVIATION .982761014

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 6.2
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 19.9
PROPORTION OF VARIABILITY DUE RESIDUAL 73.7

Table 25
Periodogram for JAPAN Total

PERIODOGRAM FROM FILE JAPAN/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	.928397753	.928397753	.0314080365	-.173089939
.0333333334	6.17980391	7.10820166	.348511339	.290746127
.05	1.52966515	8.63786681	.114925809	.194373086
.0666666667	2.24064653	10.8785133	-.16001228	.221549741
.0833333334	4.10653844	14.9850518	.243140955	.278867515
.1	.679398875	15.6644506	-.0578689314	.138916579
.116666667	.996590388	16.661041	.181257911	.0191114992
.133333333	2.31786149	18.9789025	.260137279	-.097931843
.15	2.83813971	21.8170422	.207324102	-.227203375
.166666667	1.30000001	23.1170422	-.200000001	.0577350251
.183333333	.578393887	23.6954361	-.138297018	-.012398835
.2	.153934454	23.8493706	-.0706011298	.0121090433
.216666667	2.85143632	26.7008069	.173859992	.254598862
.233333333	1.69363739	28.3944443	.236843944	.0189611628
.25	.833333347	29.2277776	.133333336	.0999999984
.266666667	2.89110015	32.1188778	-.224823884	.214065938
.283333333	.48606736	32.6049451	.0713971839	-.105378781
.3	.75393447	33.3588796	.0912022719	-.129666089
.316666667	1.56370257	34.9225822	.0404985353	-.224684863
.333333333	1.23333328	36.1559154	.166666665	.115470049
.35	1.59563209	37.7515476	-.0612585701	.222340109
.366666667	.978722836	38.7302704	.0529914959	.17267309
.383333333	2.54831046	41.2785809	-.223509425	.187048706
.4	.0793988919	41.3579797	3.93446599E-03	.0512947337
.416666667	3.76012825	45.118108	-.276474288	.221132486
.433333333	1.51450259	46.6326106	-.0216800996	-.223636743
.45	.369896289	47.0025069	.105675315	.0340969822
.466666667	6.31705852	53.3195654	-.458634448	.0149352231
.483333333	3.51376808	56.8333335	-.103281884	.326279719
.5	.0749999999	56.9083335	.0499999999	6.53436743E-09

Table 25 (cont'd)
WNT for JAPAN Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0163139157	0	.258882759	.480949728
2	.124906164	0	.293365517	3.53281112
3	.151785622	0	.327848276	.801035681
4	.191158529	0	.362331035	1.18861348
5	.263319111	0	.396813793	2.25540845
6	.275257589	0	.431296552	.350399088
7	.292769794	.0169793103	.46577931	.516906103
8	.333499531	.051462069	.500262069	1.23131346
9	.383371659	.0859448276	.534744828	1.52220745
10	.406215414	.120427586	.569227586	.677955947
11	.41637902	.154910345	.603710345	.297771004
12	.419083975	.189393103	.638193104	.0786564445
13	.469189753	.223875862	.672675862	1.52971513
14	.49895055	.258358621	.707158621	.889536441
15	.513593983	.292841379	.741641379	.430970435
16	.564396738	.327324138	.776124138	1.55213252
17	.572937972	.361806897	.810606897	.24982962
18	.586186198	.396289655	.845089655	.389356847
19	.613663765	.430772414	.879572414	.819363573
20	.635336044	.465255173	.914055172	.642418767
21	.663374681	.499737931	.948537931	.836576944
22	.680572915	.53422069	.98302069	.507476488
23	.725352129	.568703449	1	1.35947336
24	.726747336	.603186207	1	.0405175232
25	.792820756	.637668966	1	2.05169147
26	.819433776	.672151724	1	.792878454
27	.825933638	.706634483	1	.189729201
28	.936937741	.741117241	1	3.62107295
29	.998682091	.7756	1	1.90842033
30	1	.810082759	1	.0382697962

DF FOR F-RATIOS 2 AND 58

AMC TOTAL

The initial ANOVA indicated the presence of a strong trend and moderate seasonality in this series (Table 26). The periodogram also indicated trend and seasonality (Table 27). Various types of MLR models were tried; each resulted in a poor fit and produced residual series which failed the WNT.

The seasonality of the series was removed using the simple mean of the months as a fitted value for that month (the simple mean of the months model). An 11 point moving average with linear trend (MALT) was performed on the residuals. The resulting residual series passed the WNT (Table 28).

Table 26
ANOVA for Trend and Seasonality in AMC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	3473.56665	868.391663	14.2463676
MO	11	2180.04999	198.186363	3.25133911
ERROR	44	2682.03336	60.9553035	
TOTAL	59	8335.65		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	34.0833333	MO 1	29.6
YEAR 2	34.5	MO 2	29.8
YEAR 3	45.1666667	MO 3	32.6
YEAR 4	48.75	MO 4	43.8
YEAR 5	28.25	MO 5	33.8
		MO 6	36.8
		MO 7	40.6
		MO 8	40.8
		MO 9	40.2
		MO 10	46.8
		MO 11	48.4
		MO 12	34.6

GRAND MEAN 38.15 STD DEVIATION 11.8862191

PROPORTION OF VARIABILITY DUE TO TREND EFFECT, PERCENT 41.6
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 26.1
PROPORTION OF VARIABILITY DUE RESIDUAL 32.1

Table 27
Periodogram for AMC Total

PERIODOGRAM FROM FILE AMC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	2146.0568	2146.0568	-7.02491947	-4.71017336
.0333333334	533.450398	2679.5072	-.0139251384	4.21680994
.05	908.687164	3588.19436	2.02099448	5.11909694
.0666666667	344.495936	3932.6903	3.29579576	-.787989949
.0833333334	889.445278	4822.13558	-.51371807	-5.42072594
.1	65.8489367	4887.98451	-1.47426455	-.146658125
.116666667	40.1077451	4928.09226	-1.10408076	-.343410112
.133333333	65.2543095	4993.34656	-1.16057394	-.910061415
.15	289.477128	5282.82369	.564877448	3.0545296
.166666667	668.033345	5950.85703	-.966666655	-4.6188022
.183333333	48.1181665	5998.9752	-.666389447	-1.07696982
.2	2.45628393	6001.43149	-.0266123543	-.284899831
.216666667	20.6111922	6022.04268	-.632454999	.535761527
.233333333	233.961031	6256.00371	2.16913065	1.75885567
.25	298.033334	6554.03705	.966666716	-2.99999999
.266666667	90.3668539	6644.4039	-1.50300683	-.867870343
.283333333	108.022582	6752.42648	-1.87282202	-.30543478
.3	411.917742	7164.34422	2.77426453	2.45642987
.316666667	25.2045097	7189.54873	.844236603	.35695221
.333333333	172.299993	7361.84872	-2.10000002	1.1547004
.35	74.076494	7435.92522	-1.01668331	1.19815338
.366666667	49.364168	7485.28939	.302121864	1.24667343
.383333333	66.9736978	7552.26308	-.831406121	-1.241459
.4	102.11036	7654.37344	.793279172	-1.66564907
.416666667	129.421373	7783.79482	-1.55294839	-1.3792741
.433333333	83.3577093	7867.15253	-1.65732718	.178485113
.45	164.892543	8032.04507	2.29747787	.466919201
.466666667	63.4162472	8095.46132	-.698881729	-1.27492715
.483333333	217.371954	8312.83327	.0211695361	-2.69170646
.5	11.4083334	8324.2416	.616666668	1.13132332E-08

Table 27 (cont'd)
WNT for AMC Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.257808087	0	.258882759	10.0734519	
2	.321892051	0	.293365517	1.98568555	***
3	.431053606	0	.327848276	3.55360182	***
4	.47243827	0	.362331035	1.25196749	***
5	.579288277	0	.396813793	3.46935033	***
6	.58719878	0	.431296552	.231233755	***
7	.592016966	.0169793103	.46577931	.140403886	***
8	.599856035	.051462069	.500262069	.229129176	***
9	.634631231	.0859448276	.534744828	1.04481428	***
10	.714882787	.120427586	.569227586	2.53036051	***
11	.720663274	.154910345	.603710345	.168608748	***
12	.72095835	.189393103	.638193104	8.55972857E-03	***
13	.723434394	.223875862	.672675862	.0719835252	***
14	.751540382	.258358621	.707158621	.838644574	***
15	.787343443	.292841379	.741641379	1.07684307	***
16	.79819931	.327324138	.776124138	.318275276	***
17	.811176177	.361806897	.810606897	.381276941	***
18	.860660294	.396289655	.845089655	1.50974792	***
19	.863688138	.430772414	.879572414	.0880741675	
20	.88438672	.465255173	.914055172	.61294597	
21	.893285608	.499737931	.948537931	.26038489	
22	.899215778	.53422069	.98302069	.173000856	
23	.907261399	.568703449	1	.23521548	
24	.919528026	.603186207	1	.360149989	
25	.935075553	.637668966	1	.457999044	
26	.945089403	.672151724	1	.293339115	
27	.96489812	.706634483	1	.58606192	
28	.972516381	.741117241	1	.222625593	
29	.998629505	.7756	1	.777585786	
30	1	.810082759	1	.0397989039	

DF FOR F-RATIOS 2 AND 58

Table 28
Periodogram for Residuals from SMMALT Model For AMC Total

PERIODOGRAM FROM FILE AMC/RE4

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	81.0715857	81.0715857	.885250103	1.38517813
.0333333334	33.7302855	114.801871	1.06014372	.0209320418
.05	247.933738	362.735609	2.54764264	-1.33190649
.0666666667	355.650685	718.386294	-.687893184	-3.37369616
.0833333334	19.9379767	738.32427	-.670676176	-.463457323
.1	100.48101	838.805281	-1.82927718	.0557855184
.116666667	45.2090651	884.014346	-1.13062512	-.478179548
.133333333	46.0847089	930.099055	-1.02475298	-.697164468
.15	109.564688	1039.66374	1.15572123	1.52199367
.166666667	4.49432073	1044.15806	-.10663558	-.372074648
.183333333	67.9794375	1112.1375	-.901825085	-1.20527705
.2	10.3880926	1122.52559	.141462156	-.57119017
.216666667	5.73862415	1128.26422	-.267507826	.346015946
.233333333	134.227718	1262.49194	1.89702428	.935711576
.25	.422302238	1262.91424	-.0108236147	-.118150712
.266666667	80.7262788	1343.64052	-1.49237332	-.680953629
.283333333	79.7499012	1423.39042	-1.59305193	-.347153554
.3	334.275151	1757.66557	2.71918391	1.93611568
.316666667	27.6308722	1785.29644	.912949034	.295893789
.333333333	.703372674	1785.99981	.0768686979	.132427184
.35	62.1979388	1848.19775	-.758194755	1.22409368
.366666667	32.5070277	1880.70478	.301495737	.996327211
.383333333	65.2680224	1945.9728	-.665263062	-1.31644438
.4	85.5739088	2031.54671	.829361493	-1.47126583
.416666667	1.22838609	2032.7751	.196977628	-.0463251243
.433333333	49.6179844	2082.39308	-1.24233507	.332470128
.45	145.416585	2227.80967	2.18636153	.258926205
.466666667	55.3661787	2283.17585	-.477074533	-1.27198238
.483333333	161.627259	2444.80311	.379732009	-2.28984255
.5	.457397666	2445.2605	.123477078	-7.23156213E-08

Table 28 (cont'd)
WNT for AMC Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0331545803	0	.258882759	.994453517
2	.0469487284	0	.293365517	.405625555
3	.148342317	0	.327848276	3.27219352
4	.293787224	0	.362331035	4.93578742
5	.301940947	0	.396813793	.238401827
6	.343033096	0	.431296552	1.24273916
7	.361521541	.0169793103	.46577931	.546264497
8	.380368085	.051462069	.500262069	.557048201
9	.425175045	.0859448276	.534744828	1.36035521
10	.427013017	.120427586	.569227586	.0533993409
11	.454813506	.154910345	.603710345	.82926824
12	.459061762	.189393103	.638193104	.123725039
13	.461408597	.223875862	.672675862	.068218326
14	.516301611	.258358621	.707158621	1.68435682
15	.516474313	.292841379	.741641379	5.00923339E-03
16	.549487679	.327324138	.776124138	.990073251
17	.58210175	.361806897	.810606897	.977694683
18	.718805038	.396289655	.845089655	4.59215852
19	.730104805	.430772414	.879572414	.3314384
20	.730392452	.465255173	.914055172	8.34417066E-03
21	.755828572	.499737931	.948537931	.756900073
22	.769122463	.53422069	.98302069	.390717001
23	.795814107	.568703449	1	.795285141
24	.830809932	.603186207	1	1.05168346
25	.831312286	.637668966	1	.0145755825
26	.851603778	.672151724	1	.600641178
27	.911072528	.706634483	1	1.8336379
28	.933714769	.741117241	1	.671836893
29	.999812945	.7756	1	2.05251458
30	1	.810082759	1	5.42560108E-03

DF FOR F-RATIOS 2 AND 58

HSC TOTAL

The initial ANOVA indicated moderate seasonality and the possibility of a very weak trend in this series (Table 29). The periodogram supported the conjecture that mild seasonality exists in the series (Table 30). The raw data nearly passes the WNT.

Various MLR models produced unsatisfactory fits for the series.

When seasonality was removed using a simple mean of the months model, and an 11-point MALT was performed on the residual series, the final residual series passed the WNT.

Table 29
ANOVA for Trend and Seasonality for HSC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	144.666672	36.166668	1.93655695
MO	11	772.183335	70.198485	3.75880255
ERROR	44	821.73333	18.6757575	
TOTAL	59	1738.58334		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	20.4166667	MO 1	23.4
YEAR 2	22.9166667	MO 2	16.8
YEAR 3	21.9166667	MO 3	15.8
YEAR 4	23.4166667	MO 4	19
YEAR 5	19.25	MO 5	24.6
		MO 6	23.6
		MO 7	23.4
		MO 8	29.4
		MO 9	19
		MO 10	22.4
		MO 11	19.8
		MO 12	21.8

GRAND MEAN 21.5833333 STD DEVIATION 5.42839886

PROPORTION OF VARIABILITY DUE TO TREND EFFECT, PERCENT 8.3
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 44.4
PROPORTION OF VARIABILITY DUE RESIDUAL 47.2

Table 30
Periodogram for HSC Total

PERIODOGRAM FROM FILE HSC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	73.1146874	73.1146874	-1.53861416	.264239912
.0333333334	202.623618	275.738306	-2.56714004	.404861252
.05	33.0159418	308.754247	-1.01557798	-.262931087
.0666666667	29.5298361	338.284083	.887254019	-.443968665
.0833333334	271.882375	610.166458	-1.75948697	-2.44273441
.1	9.48814429	619.654602	-.456011308	-.329127883
.116666667	32.1025796	651.757182	.880840869	.542406997
.133333333	148.429089	800.186271	-1.37880796	1.74542972
.15	28.0995138	828.285785	-.500340445	-.828438229
.166666667	160.533329	988.819114	2.06666665	1.03923046
.183333333	9.60298647	998.422101	.52272987	-.216455612
.2	5.07196743	1003.49407	-.0548632195	-.407499212
.216666667	91.2676204	1094.76169	1.57556027	-.7482405
.233333333	15.0551414	1109.81683	.0217573991	.708071087
.25	98.9666672	1208.7835	1.23333333	1.33333334
.266666667	54.2226945	1263.00619	-1.17337372	-.656214347
.283333333	28.1691229	1291.17531	-.514149941	-.821352908
.3	4.34518909	1295.5205	.289344635	.247223217
.316666667	30.4066746	1325.92718	.976822733	-.2436661
.333333333	74.1333362	1400.06051	-1.53333335	-.346410244
.35	16.7891098	1416.84962	.587608269	-.462983277
.366666667	42.0802987	1458.92992	-.790238516	-.882156284
.383333333	8.37785681	1467.30778	.224853955	-.478228598
.4	2.76136395	1470.06914	-.278470057	-.120415499
.416666667	146.250958	1616.3201	-.373846274	2.17606776
.433333333	59.7076031	1676.0277	-.397712023	1.35354297
.45	32.2954272	1708.32313	1.02831006	.138176186
.466666667	5.68504297	1714.00817	.198260874	-.387548782
.483333333	4.1584709	1718.16664	-.32804355	.176077046
.5	10.2083333	1728.37498	.583333333	5.26650509E-08

Table 30 (cont'd)
WNT for AMC Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.0423025607	0	.258882759	1.28096224	
2	.159536159	0	.293365517	3.85127294	
3	.178638462	0	.327848276	.564754893	
4	.19572378	0	.362331035	.504086703	
5	.353028981	0	.396813793	5.41340811	
6	.358518614	0	.431296552	.160078129	
7	.377092466	.0169793103	.46577931	.548835676	
8	.462970293	.051462069	.500262069	2.72442468	
9	.479228058	.0859448276	.534744828	.479266987	
10	.572109135	.120427586	.569227586	2.96934742	***
11	.577665213	.154910345	.603710345	.1620265	
12	.580599743	.189393103	.638193104	.085351823	
13	.633405194	.223875862	.672675862	1.61673026	
14	.64211577	.258358621	.707158621	.254826386	
15	.699375721	.292841379	.741641379	1.76139604	
16	.730747788	.327324138	.776124138	.939256335	
17	.747045827	.361806897	.810606897	.480473912	
18	.749559858	.396289655	.845089655	.073090665	
19	.767152496	.430772414	.879572414	.519322743	
20	.810044424	.465255173	.914055172	1.29960865	
21	.819758236	.499737931	.948537931	.284463778	
22	.844104977	.53422069	.98302069	.723674616	
23	.848952222	.568703449	1	.141254798	
24	.850549887	.603186207	1	.0464064231	
25	.935167496	.637668966	1	2.68074925	
26	.969713011	.672151724	1	1.03766665	
27	.988398439	.706634483	1	.552195439	
28	.991687681	.741117241	1	.0957027957	
29	.994093681	.7756	1	.0699422965	
30	1	.810082759	1	.172300907	

DF FOR F-RATIOS 2 AND 58

8TH ARMY TOTAL

The initial ANOVA indicated the existence of a moderate trend in the series. Seasonality appeared to be weak and of dubious significance (Table 31). These indications were reinforced by the periodogram (Table 32).

Various MLR models resulted in poor fits. An acceptable model appeared to be a simple mean of the months followed by an 11-point MALT. The residual series from this model passed the WNT.

Table 31
ANOVA for Trend and Seasonality in 8TH ARMY Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	556.433335	139.108334	3.84574948
MO	11	682.933335	62.0848486	1.71638009
ERROR	44	1591.56667	36.1719697	
TOTAL	59	2830.93334		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	27.6666667	MO 1	25
YEAR 2	29.8333334	MO 2	26.4
YEAR 3	23.25	MO 3	23.6
YEAR 4	22.4166667	MO 4	25.4
YEAR 5	22.5	MO 5	29.2
		MO 6	33.2
		MO 7	25.2
		MO 8	25.4
		MO 9	22.4
		MO 10	24.6
		MO 11	21.6
		MO 12	19.6

GRAND MEAN 25.1333333 STD DEVIATION 6.92689837

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 19.6
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 24.1
PROPORTION OF VARIABILITY DUE RESIDUAL 56.2

Table 32
Periodogram for 8TH ARMY Total

PERIODOGRAM FROM FILE 8THARMY/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	682.415438	682.415438	-.0619405716	4.76899829
.0333333334	156.198955	838.614393	-1.9152954	1.2402723
.05	114.313589	952.927982	.493878226	-1.88852781
.0666666667	187.942874	1140.87086	-.436851686	-2.46453304
.0833333334	376.651365	1517.52222	-3.37583303	1.07647429
.1	54.2141285	1571.73635	1.05265092	.836100272
.116666667	8.07977616	1579.81613	-.502475771	-.129784329
.133333333	19.8622069	1599.67833	-.132661073	-.802791755
.15	66.3751099	1666.05344	1.41470017	-.459485675
.166666667	35.0333317	1701.08678	1.06666665	.173205059
.183333333	15.1830794	1716.26985	-.628971032	.332412526
.2	17.498307	1733.76816	-.183907283	-.741252327
.216666667	68.7833429	1802.55151	-1.0791642	1.06215947
.233333333	3.31408777	1805.86559	-.319666216	.091011552
.25	190.733337	1996.59893	-2.30000002	1.03333335
.266666667	83.7478971	2080.34683	-1.59183761	-.507591956
.283333333	1.44513748	2081.79196	-.0132323676	.219080245
.3	102.885884	2184.67785	-.102650948	1.84905171
.316666667	36.3035539	2220.9814	.348842542	-1.04327721
.333333333	9.23333597	2230.21474	-.43333336	-.346410255
.35	117.550254	2347.76499	-.146175946	1.97407558
.366666667	18.8313416	2366.59633	-.269185851	-.745151236
.383333333	249.058736	2615.65507	-1.84977415	-2.20913862
.4	10.2683521	2625.92342	.300574026	-.501929933
.416666667	47.2152971	2673.13872	-1.12416692	.556859018
.433333333	24.95561	2698.09433	-.895852292	-.171179261
.45	59.0277085	2757.12204	1.37093074	-.296882445
.466666667	38.8803659	2796.0024	-.405316433	-1.06382836
.483333333	10.8642823	2806.86668	-.0466177654	.599974604
.5	12.0333333	2818.90002	.633333333	3.24767814E-08

Table 32 (cont'd)
WNT for 8TH ARMY Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.242085719	0	.258882759	9.2629022	
2	.297497034	0	.293365517	1.70119348	***
3	.338049586	0	.327848276	1.2257305	***
4	.404722001	0	.362331035	2.07161997	***
5	.538338435	0	.396813793	4.47247236	***
6	.557570805	0	.431296552	.568675716	***
7	.560437092	.0169793103	.46577931	.0833612584	***
8	.567483176	.051462069	.500262069	.205786431	***
9	.591029633	.0859448276	.534744828	.699313629	***
10	.603457648	.120427586	.569227586	.364948016	***
11	.60884382	.154910345	.603710345	.157044847	***
12	.615051315	.189393103	.638193104	.181141786	
13	.639452089	.223875862	.672675862	.725320842	
14	.640627756	.258358621	.707158621	.0341344752	
15	.708290084	.292841379	.741641379	2.10461034	
16	.737999508	.327324138	.776124138	.887953904	
17	.738512168	.361806897	.810606897	.014874763	
18	.775010761	.396289655	.845089655	1.09855489	
19	.787889385	.430772414	.879572414	.378352761	
20	.791164895	.465255173	.914055172	.0953019556	
21	.832865648	.499737931	.948537931	1.26194594	
22	.839546035	.53422069	.98302069	.195034113	
23	.927899199	.568703449	1	2.81056398	
24	.931541879	.603186207	1	.10602395	
25	.948291426	.637668966	1	.494011312	
26	.957144386	.672151724	1	.259029026	
27	.978084365	.706634483	1	.620247367	
28	.99187711	.741117241	1	.405583688	
29	.995731195	.7756	1	.112200921	
30	1	.810082759	1	.124326061	

DF FOR F-RATIOS 2 AND 58

HQDA TOTAL

The initial ANOVA indicated that this series has a significant trend and exhibits weak seasonal variation (Table 33). These indications are supported by the periodogram. However, the raw data passes the WNT (Table 34).

A simple mean of the months model produced a residual series which was marginal in passing the WNT. When a simple mean of the months model followed by a 12-month MALT was used, the forecast values were very close to those of a simple mean of the months model alone (Table 63, page 130).

This series appears to be very close to being white noise.

Table 33
ANOVA for Trend and Seasonality in HQDA Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	1098.73334	274.683334	5.0900132
MO	11	1658.19998	150.745453	2.79338514
ERROR	44	2374.46668	53.9651517	
TOTAL	59	5131.39999		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	37.75	MO 1	41.6
YEAR 2	36.9166667	MO 2	39
YEAR 3	42.0833333	MO 3	48.8
YEAR 4	47.1666667	MO 4	53.8
YEAR 5	46.5833333	MO 5	43.6
		MO 6	43
		MO 7	39.8
		MO 8	42.4
		MO 9	38
		MO 10	45.4
		MO 11	35.2
		MO 12	34.6

GRAND MEAN 42.1 STD DEVIATION 9.32592523

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 21.4
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 32.3
PROPORTION OF VARIABILITY DUE RESIDUAL 46.2

Table 34
Periodogram for HQDA Total

PERIODOGRAM FROM FILE HQDA/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	1008.95929	1008.95929	-.383666764	-5.78660317
.0333333334	1.04394271	1010.00324	-.169481684	-.0779361864
.05	143.17107	1153.17431	-.576690595	-2.10708257
.0666666667	119.54038	1272.71469	-1.70036281	-1.04567951
.0833333334	674.907498	1947.62218	-3.33596129	3.37168784
.1	118.718405	2066.34059	1.98183055	.172127402
.116666667	29.1179252	2095.45851	.0226144572	-.984929486
.133333333	23.8272076	2119.28572	-.866850819	.206905559
.15	64.2360402	2183.52176	.36635541	-1.416681
.166666667	458.03335	2641.55511	-3.23333338	-2.19393108
.183333333	338.950536	2980.50565	-.993593434	-3.21109379
.2	271.096978	3251.60262	-1.2262576	2.74460529
.216666667	53.7685159	3305.37114	.953286979	-.939961594
.233333333	219.13487	3524.50601	-1.66685622	2.12745999
.25	9.93333152	3534.43934	.566666615	-.0999999891
.266666667	36.4602792	3570.89962	.721318798	-.833691688
.283333333	88.2419386	3659.14156	-1.56941316	.691621497
.3	250.348277	3909.48984	2.16816941	1.9089222
.316666667	12.4838136	3921.97365	-.494145127	.414665785
.333333333	290.099977	4212.07363	-1.0000001	2.94448621
.35	70.2661281	4282.33976	1.18572145	.967609899
.366666667	84.6590883	4366.99884	.59852605	-1.56962931
.383333333	84.1322738	4451.13112	-.634958485	1.54959248
.4	5.30302306	4456.43414	.376257678	-.187610221
.416666667	172.95916	4629.3933	-1.43070524	1.92831218
.433333333	58.7954783	4688.18878	1.38781232	-.183919099
.45	216.726713	4904.91549	1.45794681	2.25801126
.466666667	32.0721255	4936.98762	.595894625	.844973636
.483333333	142.145703	5079.13332	.866542081	-1.9968212
.5	26.1333333	5105.26666	.933333333	1.28346688E-07

Table 34 (cont'd)
WNT for HQDA Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.197631066	0	.258882759	7.14297462
2	.19783555	0	.293365517	5.93123375E-03
3	.225879349	0	.327848276	.8367354
4	.249294458	0	.362331035	.69531916
5	.381492744	0	.396813793	4.41777218
6	.404746848	0	.431296552	.690424231
7	.410450356	.0169793103	.46577931	.166350493
8	.415117537	.051462069	.500262069	.135982929
9	.427699846	.0859448276	.534744828	.36953657
10	.517417657	.120427586	.569227586	2.8582527
11	.583809985	.154910345	.603710345	2.06229828
12	.636911418	.189393103	.638193104	1.62630045
13	.647443388	.223875862	.672675862	.308678121
14	.690366684	.258358621	.707158621	1.30060169
15	.692312387	.292841379	.741641379	.0565353815
16	.699454086	.327324138	.776124138	.208599032
17	.716738578	.361806897	.810606897	.510066497
18	.765775835	.396289655	.845089655	1.49541134
19	.768221117	.430772414	.879572414	.0710869865
20	.825044785	.465255173	.914055172	1.74716679
21	.838808244	.499737931	.948537931	.404710529
22	.85539094	.53422069	.98302069	.489007261
23	.871870447	.568703449	1	.485913298
24	.872909182	.603186207	1	.0301546561
25	.906787757	.637668966	1	1.01693085
26	.91830439	.672151724	1	.337873502
27	.960755985	.706634483	1	1.28567522
28	.96703815	.741117241	1	.183334516
29	.994881103	.7756	1	.830571209
30	1	.810082759	1	.149211807

DF FOR F-RATIOS 2 AND 58

INSCOM TOTAL

The initial ANOVA indicated a significant trend and possible weak seasonality in this series (Table 35). The periodogram supported these indications. The raw data passed the WNT (Table 36).

The model that produced a residual series which passes the WNT was a simple mean of the months model followed by an 11-point MALT.

Table 35
ANOVA for Trend and Seasonality in INSCOM Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	42.8333333	10.7083333	3.49616621
MO	11	55.6500001	5.05909092	1.65174376
ERROR	44	134.766667	3.06287879	
TOTAL	59	233.25		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	4.75	MO 1	3.8
YEAR 2	3.41666667	MO 2	4.2
YEAR 3	2.33333333	MO 3	2.4
YEAR 4	3.16666667	MO 4	2
YEAR 5	2.58333333	MO 5	3.2
		MO 6	4.6
		MO 7	2.2
		MO 8	3.2
		MO 9	5.2
		MO 10	2.6
		MO 11	3
		MO 12	2.6

GRAND MEAN 3.25 STD DEVIATION 1.98831331

PROPORTION OF VARIABILITY DUE TO TREND EFFECT, PERCENT 18.3
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 23.8
PROPORTION OF VARIABILITY DUE RESIDUAL 57.7

Table 36
Periodogram for INSCOM Total

PERIODOGRAM FROM FILE INSCOM/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	19.6002888	19.6002888	.553498343	.589052244
.0333333334	34.1864634	53.7867522	-.818981018	.684703491
.05	18.2944808	72.081233	-.740599807	.247644812
.0666666667	6.02527393	78.106507	-.0517952311	-.445151343
.0833333334	2.01149667	80.1180036	2.07259792E-03	-.258931638
.1	15.0299531	95.1479567	-.114235031	.698533316
.116666667	7.66578047	102.813737	.315945355	.394594156
.133333333	8.36514325	111.17888	.524361543	-.0623143664
.15	2.21476349	113.393644	.269915093	.0311655597
.166666667	4.29999985	117.693644	-.0500000049	.375277668
.183333333	4.27766076	121.971305	.25063897	.282433706
.2	3.32404516	125.29535	-.143633886	-.300284552
.216666667	1.68097347	126.976323	-.193667735	.136107522
.233333333	3.03937993	130.015703	-.303322384	.0964789887
.25	28.4333335	158.449037	-.600000009	.766666663
.266666667	2.64537879	161.094415	.222751128	.19637013
.283333333	.343030418	161.437446	.104513999	-.0226090963
.3	.570046947	162.007493	-2.43163952E-03	.137824715
.316666667	2.98549237	164.992985	.251518965	.190406466
.333333333	11.7000002	176.692985	.450000003	-.433012706
.35	2.905335	179.59832	-.309969292	.0276321871
.366666667	4.44956479	184.047885	9.60925835E-03	.385001933
.383333333	14.6649631	198.712848	.185940568	.673986802
.4	.342621303	199.055469	-.106366094	-.0103423464
.416666667	9.05516926	208.110639	-.402072569	-.374401689
.433333333	3.02459149	211.13523	-.170639183	.267772265
.45	6.65208723	217.787317	-.11934598	-.455513752
.466666667	5.59753648	223.384854	.354682523	-.246545852
.483333333	9.71514255	233.099996	-.568388474	-.0277961899
.5	.075	233.174996	-.05	5.36403297E-09

Table 36 (cont'd)
WNT for INSCOM Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	.0840582788	0	.258882759	2.66140305
2	.230671183	0	.293365517	4.98223401
3	.309129341	0	.327848276	2.46899977
4	.334969479	0	.362331035	.769241282
5	.343596032	0	.396813793	.252346946
6	.408053857	0	.431296552	1.99806804
7	.440929511	.0169793103	.46577931	.985802874
8	.476804469	.051462069	.500262069	1.07908595
9	.486302758	.0859448276	.534744828	.278091776
10	.504743843	.120427586	.569227586	.544838877
11	.523089123	.154910345	.603710345	.541955465
12	.537344705	.189393103	.638193104	.419390518
13	.544553769	.223875862	.672675862	.210580947
14	.557588528	.258358621	.707158621	.383000333
15	.679528418	.292841379	.741641379	4.02735163
16	.690873455	.327324138	.776124138	.332781467
17	.692344583	.361806897	.810606897	.0427255826
18	.694789301	.396289655	.845089655	.0710705508
19	.707592956	.430772414	.879572414	.376121746
20	.757769863	.465255173	.914055172	1.5320014
21	.770229754	.499737931	.948537931	.365895858
22	.789312267	.53422069	.98302069	.564158427
23	.852204787	.568703449	1	1.94629017
24	.853674161	.603186207	1	.042674557
25	.892508382	.637668966	1	1.17169424
26	.905479719	.672151724	1	.381112315
27	.934008023	.706634483	1	.851615979
28	.958013755	.741117241	1	.713289255
29	.999678353	.7756	1	1.26080425
30	1	.810082759	1	9.330758E-03

DF FOR F-RATIOS 2 AND 58

BMD TOTAL

The initial ANOVA indicated a possible trend with very weak seasonality (Table 37). The periodogram was undefinitive (Table 38).

The residual series from the weighted mean of mean of the months model followed by an 11-point MALT passed the WNT.

Table 37
ANOVA for Trend and Seasonality in BMD Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	213.733334	53.4333334	10.6931474
MO	11	58.0500002	5.27727274	1.05609461
ERROR	44	219.866666	4.99696969	
TOTAL	59	491.65		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	4.66666667	MO 1	4.4
YEAR 2	3.16666667	MO 2	4.4
YEAR 3	5.83333334	MO 3	2.4
YEAR 4	5.08333334	MO 4	4.6
YEAR 5	.5	MO 5	5.4
		MO 6	5.2
		MO 7	3.8
		MO 8	3.6
		MO 9	2.8
		MO 10	4.2
		MO 11	2.4
		MO 12	3

GRAND MEAN 3.85 STD DEVIATION 2.88670242

PROPORTION OF VARIABILITY DUE TO TREND EFFECT, PERCENT 43.4
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 11.8
PROPORTION OF VARIABILITY DUE RESIDUAL 44.7

Table 38
Periodogram for BMD Total

PERIODOGRAM FROM FILE BMD/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	61.4482828	61.4482828	-1.43010317	-.0555068659
.0333333334	67.0420629	128.490346	.48773766	1.41309851
.05	75.6137494	204.104095	-.343744471	1.54993485
.0666666667	25.6586204	229.762716	.805563447	.454263005
.0833333334	18.819741	248.582457	-.679743495	.406538414
.1	1.85994574	250.442402	-1.50282833E-03	-.248989825
.116666667	14.9528641	265.395266	-.465765497	.530557541
.133333333	21.4324104	286.827677	.795890802	-.284554933
.15	5.07234036	291.900017	.202186268	.358048495
.166666667	5.7333334	297.63335	.433333335	-.0577350317
.183333333	34.366479	331.999829	-.787939107	.724362659
.2	7.9882485	339.988078	.0848361761	.50899683
.216666667	1.6038428	341.591921	.051897874	.225317636
.233333333	6.38906892	347.98099	.277938627	.36840071
.25	18.9666666	366.947656	-.433333331	.666666666
.266666667	15.9308399	382.878496	-.727667409	-.039091421
.283333333	6.18754276	389.066039	-.451104736	.0524970728
.3	1.04005413	390.106093	.184836158	.0224514052
.316666667	3.96325029	394.069343	-.362556371	.0257142114
.333333333	8.40000032	402.469344	-.500000014	.173205072
.35	2.11788443	404.587228	.148032979	.22064085
.366666667	13.4061167	417.993345	.636443179	-.204476491
.383333333	18.3081778	436.301523	-.779945126	.0442515034
.4	13.5784196	449.879942	-.101502855	.665064776
.416666667	.113592289	449.993534	.013076849	.0601282433
.433333333	5.26275172	455.256286	-.0854527895	.410027899
.45	22.0626933	477.318979	-.573141454	-.637912206
.466666667	7.41146327	484.730443	-.457120177	.195166389
.483333333	.902893918	485.633336	-.1078172	.135911424
.5	3.00833333	488.64167	.316666667	2.30165778E-08

Table 38 (cont'd)
WNT for BMD Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.12575326	0	.258882759	4.17141336	
2	.262954131	0	.293365517	4.6115314	
3	.417696868	0	.327848276	5.30908111	***
4	.470206963	0	.362331035	1.60718625	***
5	.508721363	0	.396813793	1.16165819	***
6	.512527723	0	.431296552	.110806185	***
7	.543128601	.0169793103	.46577931	.915438689	***
8	.586989801	.051462069	.500262069	1.33032445	***
9	.597370292	.0859448276	.534744828	.304191895	***
10	.609103498	.120427586	.569227586	.344302748	***
11	.679434133	.154910345	.603710345	2.1938858	***
12	.695781999	.189393103	.638193104	.481967246	***
13	.699064247	.223875862	.672675862	.095498625	***
14	.712139408	.258358621	.707158621	.384203216	***
15	.750954491	.292841379	.741641379	1.17109347	***
16	.783556786	.327324138	.776124138	.97732975	***
17	.796219526	.361806897	.810606897	.371929125	
18	.798347986	.396289655	.845089655	.0618569903	
19	.806458736	.430772414	.879572414	.237135085	
20	.823649248	.465255173	.914055172	.507244634	
21	.827983475	.499737931	.948537931	.126239763	
22	.855418951	.53422069	.98302069	.818073022	
23	.892886443	.568703449	1	1.12885254	
24	.920674535	.603186207	1	.828887874	
25	.920907	.637668966	1	6.74306329E-03	
26	.931677166	.672151724	1	.315735324	
27	.976828234	.706634483	1	1.37129647	
28	.991995715	.741117241	1	.446631221	
29	.993843478	.7756	1	.0536843172	
30	1	.810082759	1	.179645135	

DF FOR F-RATIOS 2 AND 58

MTMC TOTAL

The initial ANOVA indicated a significant trend and insignificant seasonality (Table 39). These indications were supported by the periodogram (Table 40).

The residual series from a weighted mean of the months model followed by an 11-point MALT passed the WNT.

Table 39
ANOVA for Trend and Seasonality in MTMC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	66.1666666	16.5416667	6.26182965
MO	11	30.6	2.78181819	1.0530542
ERROR	44	116.233333	2.64166667	
TOTAL	59	213		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	2.75	MO 1	2.8
YEAR 2	3	MO 2	2.2
YEAR 3	4	MO 3	2.2
YEAR 4	1.83333333	MO 4	2.4
YEAR 5	.916666667	MO 5	2.6
		MO 6	2.6
		MO 7	3
		MO 8	2.2
		MO 9	3
		MO 10	4
		MO 11	2.2
		MO 12	.8

GRAND MEAN 2.5 STD DEVIATION 1.9000446

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 31
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 14.3
PROPORTION OF VARIABILITY DUE RESIDUAL 54.5

Table 40
Periodogram for MTMC Total

PERIODOGRAM FROM FILE MTMC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	61.2326196	61.2326196	-1.05000493	.968801821
.0333333334	9.21682566	70.4494452	.421838608	.359554878
.05	12.7633588	83.2128041	-.527923354	.38306948
.0666666667	3.95842814	87.1712322	.325828427	-.16057223
.0833333334	5.54927277	92.720505	-.253269205	-.347606773
.1	.899832511	93.6203375	.158797735	.0691208822
.116666667	.269451751	93.8897893	-.0303401022	.0897842037
.133333333	6.53479875	100.424588	.36649998	-.288971262
.15	1.01489727	101.439485	-.101959675	.153082115
.166666667	3.63333339	105.072819	-.316666668	-.144337572
.183333333	.855173889	105.927993	-.160916436	.051104764
.2	.546065495	106.474058	-.0460655245	-.126807534
.216666667	.0769629185	106.551021	.0492455349	-.0118451641
.233333333	14.2678748	120.818896	.681000364	.108785705
.25	10.4666666	131.285562	-.566666667	.16666666
.266666667	7.02867212	138.314235	.180182903	.449247362
.283333333	7.89805972	146.212294	-.181218249	-.480029795
.3	7.53350092	153.745795	.307868929	.395390212
.316666667	3.60098218	157.346777	-.0658559094	-.340140763
.333333333	9.30000015	166.646777	-.350000014	.433012697
.35	9.07777603	175.724553	-2.90359507E-03	-.550076452
.366666667	.986554566	176.711108	8.48905972E-03	.181143833
.383333333	.958442655	177.669551	-.0856103212	-.156904306
.4	.6206011	178.290152	-.120601133	-.0783713603
.416666667	.584060476	178.874212	-.0800641296	.114273434
.433333333	10.3954119	189.269624	.122005323	-.575871888
.45	5.67730117	194.946925	.199453276	.386602849
.466666667	11.0114348	205.95836	-.60584465	-2.96131223E-04
.483333333	5.97497406	211.933334	.358033754	-.266416278
.5	.533333334	212.466668	-.133333333	3.60853127E-09

Table 40 (cont'd)
WNT for MTMC Total

- ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.28819871	0	.258882759	11.7417076	***
2	.331578812	0	.293365517	1.31507086	***
3	.3916511	0	.327848276	1.85343652	***
4	.41028192	0	.362331035	.550550983	***
5	.436400241	0	.396813793	.777744717	***
6	.440635412	0	.431296552	.123342314	***
7	.441903619	.0169793103	.46577931	.0368247074	
8	.472660437	.051462069	.500262069	.920251754	
9	.477437174	.0859448276	.534744828	.139190234	
10	.494537896	.120427586	.569227586	.504549088	
11	.498562875	.154910345	.603710345	.117196104	
12	.501132998	.189393103	.638193104	.0747256266	
13	.501495233	.223875862	.672675862	.0105086291	
14	.568648707	.258358621	.707158621	2.08764323	
15	.617911336	.292841379	.741641379	1.50264025	
16	.650992629	.327324138	.776124138	.992180101	
17	.6881658	.361806897	.810606897	1.11964262	
18	.723623131	.396289655	.845089655	1.06606232	
19	.740571588	.430772414	.879572414	.499979129	
20	.78434316	.465255173	.914055172	1.32748156	
21	.827068808	.499737931	.948537931	1.29434554	
22	.831712146	.53422069	.98302069	.135284978	
23	.836223172	.568703449	1	.131412555	
24	.839144106	.603186207	1	.0849552353	
25	.841893057	.637668966	1	.0799393327	
26	.890820317	.672151724	1	1.49188436	
27	.91754122	.706634483	1	.796180852	
28	.969367866	.741117241	1	1.58512442	
29	.997489802	.7756	1	.839134225	
30	1	.810082759	1	.0729789277	

DF FOR F-RATIOS 2 AND 58

CIDC TOTAL

The initial ANOVA indicated that this series does not possess any significant systematic variation (Table 41). The periodogram was undefinitive and the raw data passed the WNT (Table 42).

The residual series from the weighted mean of the months model passed the WNT.

There are very few accidents reported by the Command. This series appears to be white noise.

Table 41
ANOVA for Trend and Seasonality in CIDC Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	.566666663	.141666666	.26153846
MO	11	8	.727272727	1.34265734
ERROR	44	23.8333333	.541666667	
TOTAL	59	32.4		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	.5	MO 1	1
YEAR 2	.666666667	MO 2	1
YEAR 3	.583333333	MO 3	.8
YEAR 4	.5	MO 4	1.2
YEAR 5	.75	MO 5	.4
		MO 6	.4
		MO 7	.2
		MO 8	.2
		MO 9	1
		MO 10	.6
		MO 11	.2
		MO 12	.2

GRAND MEAN .6 STD DEVIATION .741048273

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 1.7
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 24.6
PROPORTION OF VARIABILITY DUE RESIDUAL 73.5

Table 42
Periodogram for CIDC Total

PERIODOGRAM FROM FILE CIDC/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	.0777056854	.0777056854	.0446005702	-.024514866
.0333333334	5.00161758E-03	.082707303	-2.18523993E-03	-.0127257736
.05	1.43144148	1.51414878	.0514717524	-.212286068
.0666666667	.60524163	2.11939041	-.0491030331	-.133280205
.0833333334	2.05294857	4.17233899	.0699358724	.252072594
.1	.315737868	4.48807686	8.84756447E-10	-.102589452
.116666667	.170805405	4.65888226	.0710401328	-.0254325193
.133333333	.234655081	4.89353734	4.960785E-03	-.0883019062
.15	3.07460791	7.96814525	.052412424	.315816194
.166666667	2.70000001	10.6681453	-.300000001	-1.83160107E-09
.183333333	1.69666127	12.3648065	.0536936349	.231672979
.2	1.53748708	13.9022936	.153934466	.165993221
.216666667	1.04296248	14.9452561	.0367977216	-.182787701
.233333333	.865292731	15.8105488	-.0895471535	.144306612
.25	1.33333333	17.1438822	-.0666666699	.199999998
.266666667	2.1662883	19.3101705	-.234804331	.130677221
.283333333	.617798204	19.9279687	-.133884067	.0516558823
.3	.0175954662	19.9455641	-2.84829488E-09	-.0242180829
.316666667	1.03964243	20.9852066	.101445757	-.156088135
.333333333	.899999965	21.8852065	-2.65426934E-09	.173205077
.35	.280474611	22.1656811	-.0651446234	.0714516042
.366666667	1.56838587	23.734067	-.166913057	.156267592
.383333333	.591602192	24.3256692	.0515106087	.130639696
.4	.195846269	24.5215155	.0793988653	.0149676029
.416666667	1.01371806	25.5352335	-.103269202	-.152072594
.433333333	1.52798638	27.0632199	-.191354542	-.11965082
.45	.8801427	27.9433626	-.138739554	-.100446135
.466666667	2.76048161	30.7038442	.195613242	.231843725
.483333333	1.69615572	32.3999999	-.0252043688	.23643871
.5	9.59973995E-16	32.3999999	-4.26856181E-11	5.65661658E-09

Table 42 (cont'd)
WNT for CIDC Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	2.39832363E-03	0	.258882759	.069718593
2	2.55269454E-03	0	.293365517	4.47744769E-03
3	.0467329873	0	.327848276	1.34044996
4	.0654132846	0	.362331035	.55204091
5	.128775895	0	.396813793	1.96182186
6	.138520891	0	.431296552	.285385968
7	.143792663	.0169793103	.46577931	.153691609
8	.151035104	.051462069	.500262069	.211563015
9	.24593041	.0859448276	.534744828	3.04049233
10	.329263744	.120427586	.569227586	2.63636366
11	.381629832	.154910345	.603710345	1.60253506
12	.429083137	.189393103	.638193104	1.44470172
13	.461273337	.223875862	.672675862	.964565358
14	.487979903	.258358621	.707158621	.795741945
15	.529132166	.292841379	.741641379	1.24463519
16	.595992917	.327324138	.776124138	2.07789112
17	.615060763	.361806897	.810606897	.563716385
18	.615603832	.396289655	.845089655	.0157575826
19	.647691562	.430772414	.879572414	.961393074
20	.675469339	.465255173	.914055172	.828571394
21	.684125962	.499737931	.948537931	.253234244
22	.732532934	.53422069	.98302069	1.47521275
23	.750792261	.568703449	1	.539368996
24	.756836899	.603186207	1	.176360534
25	.788124493	.637668966	1	.936645631
26	.835284567	.672151724	1	1.43533253
27	.862449465	.706634483	1	.809779633
28	.947649515	.741117241	1	2.70091996
29	1	.7756	1	1.60203118
30	1	.810082759	1	0

DF FOR F-RATIOS 2 AND 58

USARSO TOTAL

The initial ANOVA indicated a significant trend and possible weak seasonality in the series (Table 43). The periodogram also indicates trend (Table 44).

The residual series from a weighted mean of the months model followed by an 11-point MALT passed the WNT.

Table 43
ANOVA for Trend and Seasonality in USARSO Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	539.566668	134.891667	8.25216669
MO	11	292.183334	26.5621213	1.62497104
ERROR	44	719.233332	16.3462121	
TOTAL	59	1550.98333		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	9.25	MO 1	11
YEAR 2	6.58333334	MO 2	7.6
YEAR 3	12.3333333	MO 3	8.2
YEAR 4	15.3333333	MO 4	13.6
YEAR 5	12.4166667	MO 5	12
		MO 6	11.4
		MO 7	9.4
		MO 8	12.4
		MO 9	15.6
		MO 10	9.2
		MO 11	12.6
		MO 12	11.2

GRAND MEAN 11.1833333 STD DEVIATION 5.12716814

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 34.7
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 18.8
PROPORTION OF VARIABILITY DUE RESIDUAL 46.3

Table 44
Periodogram for USARSO Total

PERIODOGRAM FROM FILE USARSO/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	617.112224	617.112224	-.209851668	-4.53060369
.0333333334	63.4461135	680.558337	-.748772346	1.24667976
.05	129.423536	809.981873	-2.03294112	-.425756089
.0666666667	4.35572142	814.337594	.358413086	.129347493
.0833333334	50.7416693	865.079264	-.48245734	-1.20773503
.1	9.91878286	874.998047	-.320027089	-.477712003
.116666667	19.6159847	894.614031	.774937917	.230948872
.133333333	49.6859164	944.299948	.903987994	.915971026
.15	.30510442	944.605052	-.0343241941	-.0948261411
.166666667	30.6333346	975.238386	-.0166666696	-1.01036299
.183333333	6.72626125	981.964648	-.126933285	.456176116
.2	17.6552907	999.619939	.661448651	.388581231
.216666667	22.4199263	1022.03987	.831806942	-.235431706
.233333333	40.8311827	1062.87105	.377458613	1.10388605
.25	126.299998	1189.17105	1.49999998	1.4
.266666667	13.1458795	1202.31693	-.517075292	.413314802
.283333333	7.35798919	1209.67491	-.385767127	-.310564051
.3	37.3478825	1247.0228	-.729972905	-.843841795
.316666667	21.8769809	1268.89978	.392000712	.758662072
.333333333	6.43333379	1275.33311	.416666672	-.20207262
.35	49.481406	1324.81452	.691702865	1.08209396
.366666667	3.23061544	1328.04513	.293335082	.147111219
.383333333	6.73253502	1334.77767	.455853962	.128899183
.4	38.0780492	1372.85572	-.344782	1.07256407
.416666667	73.2583236	1446.11404	-1.11754256	-1.09226496
.433333333	13.02542	1459.13946	-.572021287	-.327066221
.45	9.6566239	1468.79608	-.291104254	-.486976156
.466666667	37.8791448	1506.67523	.83800746	.74858644
.483333333	39.4914222	1546.16665	-.465380815	-1.04871418
.5	2.40833334	1548.57499	-.283333334	1.26786234E-08

Table 44 (cont'd)
WNT for USARSO Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.398503288	0	.258882759	19.2130649	***
2	.439473932	0	.293365517	1.23890749	***
3	.523049824	0	.327848276	2.64473713	***
4	.525862553	0	.362331035	.0817992145	***
5	.558629238	0	.396813793	.982424674	***
6	.565034341	0	.431296552	.186945404	***
7	.577701461	.0169793103	.46577931	.372059392	***
8	.609786389	.051462069	.500262069	.961306348	***
9	.609983412	.0859448276	.534744828	5.71478555E-03	***
10	.62976504	.120427586	.569227586	.585244304	***
11	.634108556	.154910345	.603710345	.126511486	***
12	.645509548	.189393103	.638193104	.334441732	***
13	.659987327	.223875862	.672675862	.426023465	
14	.686354267	.258358621	.707158621	.785348477	
15	.767913118	.292841379	.741641379	2.57524035	***
16	.776402135	.327324138	.776124138	.248289223	***
17	.781153594	.361806897	.810606897	.138450128	
18	.805271175	.396289655	.845089655	.716694796	
19	.819398344	.430772414	.879572414	.415558572	
20	.823552701	.465255173	.914055172	.120978953	
21	.855505565	.499737931	.948537931	.95721894	
22	.857591751	.53422069	.98302069	.0606258739	
23	.861939319	.568703449	1	.126630001	
24	.886528409	.603186207	1	.731059693	
25	.933835336	.637668966	1	1.44002399	
26	.942246565	.672151724	1	.245994785	
27	.948482379	.706634483	1	.181973325	
28	.972943025	.741117241	1	.727145178	
29	.998444807	.7756	1	.758905121	
30	1	.810082759	1	.0451708525	

DF FOR F-RATIOS 2 AND 58

WESTCOM TOTAL

The initial ANOVA indicated a significant trend and possible weak seasonality in the series (Table 45). These indications were supported by the periodogram (Table 46).

The residual series from a weighted mean of the months followed by an 11-point MALT passed the WNT.

Table 45
ANOVA for Trend and Seasonality in WESTCOM Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	821.066666	205.266667	9.57427558
MO	11	434.583328	39.5075753	1.84275616
ERROR	44	943.333336	21.439394	
TOTAL	59	2198.98333		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	13.3333333	MO 1	18.6
YEAR 2	12.3333333	MO 2	17.2
YEAR 3	20.5833333	MO 3	14
YEAR 4	21.5	MO 4	15.4
YEAR 5	17.3333333	MO 5	12
		MO 6	19.2
		MO 7	18
		MO 8	18
		MO 9	21.2
		MO 10	20.4
		MO 11	16.6
		MO 12	13.6

GRAND MEAN 17.0166667 STD DEVIATION 6.10499009

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 37.3
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 19.7
PROPORTION OF VARIABILITY DUE RESIDUAL 42.8

Table 46
Periodogram for WESTCOM Total

PERIODOGRAM FROM FILE WESTCOM/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	681.255947	681.255947	-2.01661162	-4.31761614
.0333333334	88.6925609	769.948508	1.49620613	.847222479
.05	66.9661009	836.914609	.767000676	1.28215183
.0666666667	39.3284871	876.243096	1.05496946	-.444959571
.0833333334	169.415755	1045.65885	.167222024	-2.37049122
.1	8.41099276	1054.06984	-.517459944	-.112256988
.116666667	65.6354758	1119.70532	.960964437	-1.12445389
.133333333	2.02801002	1121.73333	.0971420686	-.241171624
.15	16.7649766	1138.49831	.271996223	.696312148
.166666667	57.6333329	1196.13164	-.883333353	1.06809798
.183333333	5.2913389	1201.42298	-.339518995	-.247193882
.2	21.2108972	1222.63387	.819807887	-.186935642
.216666667	1.04215476	1223.67603	-.165233191	-.0862350531
.233333333	65.5082378	1289.18427	1.46988636	.151795937
.25	88.5666663	1377.75093	-1.63333333	.533333317
.266666667	43.3701854	1421.12112	.539812529	-1.07437204
.283333333	61.9584515	1483.07957	.0584055801	1.43592148
.3	92.1890008	1575.26857	1.23412661	-1.24494908
.316666667	1.78973645	1577.05831	.105259225	-.22040503
.333333333	46.2333284	1623.29164	-.0166667022	1.24130301
.35	58.9827591	1682.27439	1.40182986	-.0310645449
.366666667	16.0209406	1698.29533	-.509512267	.523859334
.383333333	21.2456929	1719.54103	.757176202	.367251905
.4	286.855762	2006.39679	2.49685884	-1.82415862
.416666667	67.9175708	2074.31436	-1.33388859	-.696175444
.433333333	23.4782519	2097.79261	-.0732467259	.881614039
.45	61.5528362	2159.34545	-.807493517	1.1830957
.466666667	14.7066519	2174.0521	.491409217	.498737115
.483333333	20.1145371	2194.16664	.806224942	.143129003
.5	2.40833332	2196.57497	.283333333	1.93105187E-08

Table 46 (cont'd)
WNT for WESTCOM Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.310144637	0	.258882759	13.0377974	***
2	.350522299	0	.293365517	1.22022189	***
3	.381008898	0	.327848276	.91191249	***
4	.398913357	0	.362331035	.528695324	***
5	.476040593	0	.396813793	2.42361668	***
6	.479869732	0	.431296552	.111471895	***
7	.509750559	.0169793103	.46577931	.893234556	***
8	.510673819	.051462069	.500262069	.0267992838	***
9	.518306145	.0859448276	.534744828	.22303977	
10	.544543963	.120427586	.569227586	.781398903	
11	.546952867	.154910345	.603710345	.0700269132	
12	.556609217	.189393103	.638193104	.282764628	
13	.557083662	.223875862	.672675862	.0137654462	
14	.586906563	.258358621	.707158621	.891449746	
15	.627226911	.292841379	.741641379	1.21841708	
16	.64697137	.327324138	.776124138	.584122507	
17	.675178216	.361806897	.810606897	.841741395	
18	.717147646	.396289655	.845089655	1.27043283	
19	.717962431	.430772414	.879572414	.0236480322	
20	.739010349	.465255173	.914055172	.623513257	
21	.765862498	.499737931	.948537931	.800199403	
22	.773156099	.53422069	.98302069	.213068457	
23	.78282829	.568703449	1	.283233024	
24	.913420583	.603186207	1	4.35604201	
25	.944340343	.637668966	1	.92528255	
26	.955028915	.672151724	1	.313317528	
27	.983051103	.706634483	1	.836072015	
28	.989746368	.741117241	1	.19547142	
29	.998903596	.7756	1	.268013868	
30	1	.810082759	1	.0318306178	

DF FOR F-RATIOS 2 AND 58

MDW TOTAL

The initial ANOVA indicated a significant trend and weak seasonality in this series (Table 47). The periodogram indicated trend but no seasonality (Table 48).

The residual series from a weighted mean of the months followed by an 11-point MALT passed the WNT.

Table 47
ANOVA for Trend and Seasonality in MDW Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	235.433333	58.8583334	5.63768957
MO	11	187.383333	17.0348485	1.63166679
ERROR	44	459.366667	10.4401515	
TOTAL	59	882.183334		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	7.25	MO 1	9.2
YEAR 2	8.66666667	MO 2	5.2
YEAR 3	10.75	MO 3	4.8
YEAR 4	8.08333333	MO 4	7.4
YEAR 5	4.66666667	MO 5	8.6
		MO 6	10.4
		MO 7	9
		MO 8	8.4
		MO 9	10
		MO 10	7
		MO 11	5.8
		MO 12	8.8

GRAND MEAN 7.88333334 STD DEVIATION 3.86681522

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 26.6
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 21.2
PROPORTION OF VARIABILITY DUE RESIDUAL 52

Table 48
Periodogram for MDW Total

PERIODOGRAM FROM FILE MDW/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	155.790525	155.790525	-2.25478189	.330115318
.0333333334	55.3938047	211.18433	.318442225	1.32100519
.05	42.7421608	253.92649	-1.15142107	-.314592128
.0666666667	69.1103087	323.036799	.0871310811	1.51528385
.0833333334	57.8794791	380.916278	-.941944335	-1.02081185
.1	41.6253211	422.541599	-1.17568366	-.0726542551
.116666667	32.3044118	454.846011	-1.03767457	-6.7244778E-03
.133333333	7.93971347	462.785724	.265666683	.440543221
.15	4.45278944	467.238514	.342142421	.177101322
.166666667	43.0333326	510.271847	1.11666666	.43301269
.183333333	6.12705599	516.398902	-.424524457	.15496511
.2	28.972406	545.371308	-.520601109	-.833499461
.216666667	62.2705735	607.641882	1.09326759	-.938323907
.233333333	16.8242087	624.466091	-1.51912464E-03	.748868912
.25	59.3666668	683.832757	.333333318	1.36666667
.266666667	30.2185218	714.051279	.513442958	-.86235746
.283333333	9.41986926	723.471148	.247424773	.502768956
.3	2.94134573	726.412494	-.057649702	.30776837
.316666667	22.237785	748.650279	.388208394	.768474947
.333333333	24.6333326	773.283612	.616666651	.663952805
.35	5.17329577	778.456907	-.377333343	-.173386102
.366666667	.975995667	779.432903	-.0708738389	-.165861653
.383333333	4.35220909	783.785112	-.238918303	.296633917
.4	24.1275916	807.912704	-.446065533	-.777996526
.416666667	2.45385329	810.366557	-.191388957	-.212521474
.433333333	4.43932429	814.805882	.137284093	-.3593474
.45	31.4317536	846.237635	.519945317	-.881692684
.466666667	32.4314589	878.669094	-.149574126	1.02891992
.483333333	3.4975702	882.166664	.193665101	-.281210778
.5	8.33333358E-03	882.174998	-.0166666669	1.73599612E-08

Table 48 (cont'd)
WNT for MDW Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.176598209	0	.258882759	6.21974366	
2	.239390518	0	.293365517	1.94298123	
3	.287841404	0	.327848276	1.47661922	
4	.36618222	0	.362331035	2.46499323	***
5	.431792194	0	.396813793	2.03629021	***
6	.478977074	0	.431296552	1.43612489	***
7	.515596126	.0169793103	.46577931	1.10231835	***
8	.524596283	.051462069	.500262069	.263374969	***
9	.529643795	.0859448276	.534744828	.147120458	
10	.578424743	.120427586	.569227586	1.48719423	***
11	.585370141	.154910345	.603710345	.202825225	
12	.618212157	.189393103	.638193104	.984759985	
13	.688799709	.223875862	.672675862	2.2025087	***
14	.707870992	.258358621	.707158621	.563819967	***
15	.775166785	.292841379	.741641379	2.09238686	***
16	.809421352	.327324138	.776124138	1.02861726	***
17	.820099357	.361806897	.810606897	.313004413	***
18	.823433554	.396289655	.845089655	.097015196	
19	.848641461	.430772414	.879572414	.749933552	
20	.876564869	.465255173	.914055172	.833040156	
21	.88242912	.499737931	.948537931	.17106646	
22	.883535472	.53422069	.98302069	.0321197341	
23	.888468971	.568703449	1	.143780801	
24	.91581909	.603186207	1	.815456293	
25	.918600685	.637668966	1	.0808912553	
26	.923632934	.672151724	1	.146673322	
27	.959262774	.706634483	1	1.07144061	
28	.996025841	.741117241	1	1.10681902	
29	.999990554	.7756	1	.115434328	
30	1	.810082759	1	2.73950381E-04	

DF FOR F-RATIOS 2 AND 58

USACE TOTAL

The initial ANOVA indicated the existance of a significant trend and weak seasonality in the series (Table 49). The periodogram supported these indications (Table 50).

The residual series produced by a simple mean of the months model followed by a 12-point MALT passed the WNT (Table 51).

Table 49
ANOVA for Trend and Seasonality in USACE Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	586.433335	146.608334	6.00872483
MO	11	314.849999	28.6227271	1.17309901
ERROR	44	1073.56667	24.3992424	
TOTAL	59	1974.85		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	18.0833333	MO 1	18.4
YEAR 2	21.4166667	MO 2	18
YEAR 3	20.1666667	MO 3	13
YEAR 4	15.0833333	MO 4	16
YEAR 5	13	MO 5	16.4
		MO 6	15.4
		MO 7	19.2
		MO 8	18
		MO 9	21.2
		MO 10	20.8
		MO 11	15.4
		MO 12	18.8

GRAND MEAN 17.55 STD DEVIATION 5.78550204

PROPORTION OF VARIABILITY DUE TO TREND EFFECT. PERCENT 29.6
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 15.9
PROPORTION OF VARIABILITY DUE RESIDUAL 54.3

Table 50
Periodogram for USACE Total

PERIODOGRAM FROM FILE USACE/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	614.886709	614.886709	-2.57138065	3.72615421
.0333333334	84.3456726	699.232381	-1.14193245	-1.22780809
.05	235.698261	934.930642	-1.15445192	2.55418274
.0666666667	23.0129072	957.94355	-.875787681	9.63557553E-03
.0833333334	140.182937	1098.12649	.706859057	-2.04282032
.1	122.376066	1220.50255	-1.98355258	.380422602
.116666667	38.8029221	1259.30548	.567784756	.985419306
.133333333	73.6429951	1332.94847	-.772225117	-1.36324425
.15	14.1644932	1347.11296	.384389842	-.569556161
.166666667	18.0333332	1365.1463	-.283333366	.72168782
.183333333	63.0593388	1428.20564	-.22086158	-1.4328985
.2	1.69797489	1429.90361	.0363390525	-.235114092
.216666667	33.500267	1463.40388	-1.0039565	-.329767954
.233333333	8.72971883	1472.1336	-.205256896	-.498858932
.25	60.4333333	1532.56693	-.23333335	1.4
.266666667	46.8456609	1579.41259	.119421591	-1.24388927
.283333333	42.8847909	1622.29738	1.19324108	.0752910957
.3	17.0572658	1639.35465	-.716447421	-.23511406
.316666667	40.6580795	1680.01273	1.08125351	.431462814
.333333333	33.2999979	1713.31273	-.450000005	.952627905
.35	72.8300648	1786.14279	-1.51772317	.352399229
.366666667	39.5159127	1825.6587	.539281603	-1.01310041
.383333333	25.8190299	1851.47773	-.605702023	-.702680147
.4	7.73536047	1859.21309	-.336339032	.380422666
.416666667	58.0837353	1917.29683	1.22647437	-.657179676
.433333333	19.8753721	1937.1722	.757907864	-.296796349
.45	7.37384318	1944.54604	.0211185253	.495326943
.466666667	20.3651064	1964.91115	-.0214089036	.823637383
.483333333	5.12219306	1970.03334	-.373711876	.176292945
.5	2.40833333	1972.44168	.283333333	3.20866699E-08

Table 50 (cont'd)
WNT for USACE Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.311738855	0	.258882759	13.1351695	***
2	.354500916	0	.293365517	1.29549795	***
3	.473996597	0	.327848276	3.93567036	***
4	.485663815	0	.362331035	.342343522	***
5	.55673458	0	.396813793	2.2187397	***
6	.618777512	0	.431296552	1.91825949	***
7	.638450045	.0169793103	.46577931	.5819519	***
8	.675786	.051462069	.500262069	1.1247358	***
9	.682967198	.0859448276	.534744828	.209761061	***
10	.692109842	.120427586	.569227586	.267583112	***
11	.724080034	.154910345	.603710345	.957755177	***
12	.724940883	.189393103	.638193104	.0249861338	***
13	.741925044	.223875862	.672675862	.501050594	***
14	.746350888	.258358621	.707158621	.128920049	***
15	.776989732	.292841379	.741641379	.916610367	***
16	.800739819	.327324138	.776124138	.705508405	***
17	.822481801	.361806897	.810606897	.644530848	***
18	.831129593	.396289655	.845089655	.252973638	
19	.851742664	.430772414	.879572414	.610360452	
20	.868625291	.465255173	.914055172	.498003806	
21	.905549103	.499737931	.948537931	1.11184406	
22	.925583111	.53422069	.98302069	.592863671	
23	.938672993	.568703449	1	.384641505	
24	.942594712	.603186207	1	.114177603	
25	.972042343	.637668966	1	.879892048	
26	.982118875	.672151724	1	.295193964	
27	.985857309	.706634483	1	.10882141	
28	.99618213	.741117241	1	.302543507	
29	.998779009	.7756	1	.0755055771	
30	1	.810082759	1	.0354520222	

DF FOR F-RATIOS 2 AND 58

Table 51
Periodogram for Residuals from an
SMMALT Model for USACE Residuals

PERIODOGRAM FROM FILE USACE/RE4

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	.301719694	.301719694	.0919171689	-.0401068226
.0333333334	29.08744	29.3891597	-.678283598	.713801579
.05	44.8804826	74.2696423	1.15842745	.392507226
.0666666667	27.0942016	101.363844	-.882733449	.352025156
.0833333334	17.4515105	118.815354	-.352212569	-.676508183
.1	118.583808	237.399162	-1.84418317	.742820331
.116666667	23.9997152	261.398877	.856874678	.256429898
.133333333	53.9347137	315.333591	-.578643662	-1.20954343
.15	19.5443891	334.87798	.272463652	-.759765224
.166666667	2.51019402	337.388174	.20478632	-.204293165
.183333333	64.248193	401.636367	-.466029028	-1.38723588
.2	3.33493626	404.971304	.138322584	-.303366782
.216666667	19.9259905	424.897294	-.761450111	-.29050544
.233333333	7.28958055	432.186875	-.14408746	-.471407278
.25	1.33354241	433.520417	.132051284	-.164358974
.266666667	46.3737592	479.894176	.0385076285	-1.24270235
.283333333	53.320894	533.21507	1.33147416	-.0673773377
.3	7.3419497	540.55702	-.477697162	-.128596572
.316666667	27.4931262	568.050146	.897449689	.333199033
.333333333	6.69647998E-03	568.056843	9.65814075E-03	-.0113989612
.35	50.9373994	618.994242	-1.21335054	.475072388
.366666667	40.057361	659.051603	.49764421	-1.04287852
.383333333	18.8715763	677.92318	-.4264865	-.668701585
.4	3.15003329	681.073213	-.177211486	.271288037
.416666667	.301943748	681.375156	.0970843707	-.0252866874
.433333333	18.9029344	700.278091	.716735417	-.341157083
.45	7.6063461	707.884437	.164083358	.476047814
.466666667	19.2501917	727.134629	.0326557779	.800379072
.483333333	3.48562956	730.620258	-.292553444	.174928942
.5	1.84308437E-04	730.620442	-2.47863159E-03	-2.21608332E-08

Table 51 (cont'd)
WNT for USACE Residuals

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO
1	4.12963664E-04	0	.258882759	.0119808939
2	.0402249348	0	.293365517	1.20241779
3	.101652839	0	.327848276	1.89799935
4	.138736665	0	.362331035	1.11684796
5	.162622543	0	.396813793	.709640845
6	.324928169	0	.431296552	5.61883103
7	.357776572	.0169793103	.46577931	.984958002
8	.431597	.051462069	.500262069	2.31142261
9	.4583474	.0859448276	.534744828	.797083916
10	.461783102	.120427586	.569227586	.0999788535
11	.549719586	.154910345	.603710345	2.7960312
12	.554284113	.189393103	.638193104	.132978247
13	.58155681	.223875862	.672675862	.813083206
14	.591534058	.258358621	.707158621	.292256073
15	.593359277	.292841379	.741641379	.0530281451
16	.656831028	.327324138	.776124138	1.96543008
17	.729811321	.361806897	.810606897	2.28304585
18	.739860246	.396289655	.845089655	.294376984
19	.77749008	.430772414	.879572414	1.13393498
20	.777499245	.465255173	.914055172	2.65800387E-04
21	.84721725	.499737931	.948537931	2.17334329
22	.902043749	.53422069	.98302069	1.68219748
23	.927873271	.568703449	1	.768916874
24	.93218472	.603186207	1	.125573443
25	.932597991	.637668966	1	.0119897957
26	.958470432	.672151724	1	.770228481
27	.968881236	.706634483	1	.30508954
28	.995228968	.741117241	1	.784760902
29	.999999748	.7756	1	.139015841
30	1	.810082759	1	7.3151945E-06

DF FOR F-RATIOS 2 AND 58

ARMYWIDE TOTAL

The initial ANOVA indicated a significant trend and strong seasonality in this series (Table 52). These indications were supported by the periodogram (Table 53).

The residual series from either a weighted mean of the months or simple mean of the months model followed by an 11-point MALT passed the WNT.

Table 52
ANOVA for Trend and Seasonality in ARMYWIDE Total

ANOVA TABLE FOR ACCDT DATA

SOURCE	DF	SS	MSS	F RATIO
YEAR	4	154580.75	38645.1875	9.49269039
MO	11	2300076.03	209097.821	51.3621748
ERROR	44	179126.063	4071.04688	
TOTAL	59	2633782.84		

FACTOR	MEAN	FACTOR	MEAN
YEAR 1	1316	MO 1	1203.4
YEAR 2	1310.58333	MO 2	1026.6
YEAR 3	1299.66667	MO 3	926.2
YEAR 4	1346.25	MO 4	1343
YEAR 5	1197.25	MO 5	1167.2
		MO 6	1332.8
		MO 7	1262.2
		MO 8	1537.4
		MO 9	1636.2
		MO 10	1491.2
		MO 11	1366.6
		MO 12	1234.6

GRAND MEAN 1293.95 STD DEVIATION 211.282719

PROPORTION OF VARIABILITY DUE TO TREND EFFECT, PERCENT 5.8
PROPORTION OF VARIABILITY DUE TO SEASONAL EFFECT 87.3
PROPORTION OF VARIABILITY DUE RESIDUAL 6.8

Table 53
Periodogram for ARMYWIDE Total

PERIODOGRAM FROM FILE ARMYWIDE/RAW

FREQUENCY	ORDINATE	CUM. ORDINATE	COEFF. A	COEFF. B
.0166666667	49036.0058	49036.0058	-39.642858	7.93582591
.0333333334	107079.572	156115.578	-30.2331486	51.5293684
.05	42772.9043	198888.482	9.93901277	36.4277299
.0666666667	2650.7797	201539.262	-3.37778951	8.772107
.0833333334	1677039.36	1878578.62	-26.2894706	-234.968457
.1	13478.1053	1892056.73	5.74098411	20.4037075
.116666667	4417.38759	1896474.12	5.95920521	-10.5704364
.133333333	5747.41826	1902221.53	12.6028725	-5.72260551
.15	12127.5629	1914349.1	20.0916215	-.760817639
.166666667	103064.407	2017413.51	-32.4000011	-48.8438346
.183333333	219.790586	2017633.3	2.69863542	-.209092681
.2	2974.7571	2020608.05	-6.4868382	7.55509763
.216666667	13841.8623	2034449.92	12.5624622	-17.4235459
.233333333	7108.86405	2041558.78	-7.91685611	13.2017243
.25	228358.831	2269917.61	44.0666656	75.3
.266666667	8210.62246	2278128.23	-13.391016	-9.71432475
.283333333	2253.23235	2280381.46	-7.93117614	3.49344959
.3	1411.46171	2281792.93	6.8590163	.0511771838
.316666667	864.628579	2282657.56	-4.19334191	-3.35213906
.333333333	29469.9939	2312127.55	-11.5000011	29.1561847
.35	25697.6802	2337825.23	14.3343469	25.5169716
.366666667	3206.37269	2341031.6	-4.56537544	-9.27558284
.383333333	560.809751	2341592.41	-.0682817141	4.32307714
.4	12065.3361	2353657.75	13.7868412	-14.5636836
.416666667	194204.084	2547861.83	-66.8771898	-44.7315433
.433333333	10140.6206	2558002.45	-18.3846112	-.163576047
.45	937.519572	2558939.97	4.73501408	-2.97158108
.466666667	5752.68594	2564692.66	-11.3340728	-7.95581501
.483333333	1150.81573	2565843.47	2.61535448	-5.61430721
.5	33969.6751	2599813.15	33.6500001	2.03501658E-06

Table 53 (cont'd)
WNT for ARMYWIDE Total

ORDINATE	#ORDINATE	INTERVAL FOR WHITE NOISE ORDINATE		F-RATIO	
1	.0188613577	0	.258882759	.557494477	
2	.0600487686	0	.293365517	1.24574388	
3	.076501068	0	.327848276	.485097655	
4	.077520672	0	.362331035	.0295986932	
5	.722582169	0	.396813793	52.7042946	***
6	.727766429	0	.431296552	.151127001	***
7	.729465546	.0169793103	.46577931	.0493582694	***
8	.73167625	.051462069	.500262069	.0642524719	***
9	.736341033	.0859448276	.534744828	.135912697	***
10	.775984038	.120427586	.569227586	1.19710396	***
11	.776068579	.154910345	.603710345	2.45189321E-03	***
12	.777212799	.189393103	.638193104	.0332203817	***
13	.782536975	.223875862	.672675862	.155227558	***
14	.78527135	.258358621	.707158621	.079514299	***
15	.873107982	.292841379	.741641379	2.79255056	***
16	.87626614	.327324138	.776124138	.0918767588	***
17	.877132831	.361806897	.810606897	.0251558164	***
18	.877675739	.396289655	.845089655	.0157529129	***
19	.878008313	.430772414	.879572414	9.64783955E-03	
20	.889343741	.465255173	.914055172	.332496394	
21	.899228174	.499737931	.948537931	.289510211	
22	.900461483	.53422069	.98302069	.035810127	
23	.900677195	.568703449	1	6.25698295E-03	
24	.905318042	.603186207	1	.135212072	
25	.980017289	.637668966	1	2.34116113	
26	.983917808	.672151724	1	.113557981	
27	.984278418	.706634483	1	.0104614727	
28	.986491148	.741117241	1	.0643114852	
29	.986933801	.7756	1	.0128426256	
30	1	.810082759	1	.383936347	

DF FOR F-RATIOS 2 AND 58

As a result of the above findings, we developed some special software to compare the fit and predicted values of the following 6 models:

explain the criteria for picking these 6

(1) Weighted mean of the months model (WM).

(2) A WM model followed by a 12-point MALT (WMMALT)

(3) Simple mean of the months model (SM).

(4) An SM model followed by a 12-point MALT (SMMALT).

(5) A 12-point simple moving average model (SMPL MA).

(6) A SM model followed by an SMPL MA model (SMSMA).

The object was to compare the results of the:

(a) WM and SM models for the series which appeared to be purely seasonal in nature.

(b) WMMALT and SMMALT models for the series which exhibited both trend and seasonality.

It was felt that the SMPL MA model might be appropriate for some of the series which appeared to be nearly white noise, and the SMSMA model might fit some of the series which showed strong seasonality and weak trend.

The results of the application of these models to the various MACOM and ARMYWIDE series are in Tables 54-72 on pages 121-139.

The SMPL MA and SMSMA models produced disappointing results. Neither model seemed appropriate for any of the series. It should be noted that perhaps a longer SMPL MA might be effective for some of the near white noise series.

For the purely seasonal series, the WM and SM models generally produced similar results, although in some cases there was a significant difference in the predicted values. We reached a similar conclusion for

the WMMALT and SMMALT models whenever the series showed both trend and seasonality. It should be noted that it was difficult to compare the predicted results to the final monthly totals for October - March 1987 because the series we obtained showing the final totals for these months also showed that there were some changes in the historical data upon which our models were fitted.

Table 54
Fitted and Forecasted Values from 6 Models for FORSCOM Total

MACOM: FORSCOM

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	403	403.2	-.2	417.27	-14.27	404.4	-1.4	415.68	-12.68	413	-10	404.63	-1.63
2	308	320.9	-12.9	333.22	-25.22	325.2	-17.2	334.47	-26.47	413	-105	325.43	-17.43
3	329	315.5	13.5	326.06	2.94	314.6	14.4	321.86	7.14	413	-84	314.83	14.17
4	431	422.9	8.1	431.71	-.71	423.6	7.4	428.85	2.15	413	18	423.83	7.17
5	414	355.4	58.6	362.46	51.54	368.4	45.6	371.64	42.36	413	1	368.63	45.37
6	428	422.6	5.4	427.9	.1	428	0	429.23	-1.23	413	15	428.23	-.23
7	417	409.1	7.9	412.65	4.35	414.6	2.4	413.82	3.18	413	4	414.83	2.17
8	507	494.3	12.7	496.09	10.91	493.25	13.75	490.47	16.53	413	94	493.48	13.52
9	426	438.3	-12.3	438.34	-12.34	444.8	-18.8	440.01	-14.01	413	13	445.03	-19.03
10	447	438.3	8.7	436.59	10.41	445	2	438.2	8.8	413	34	445.23	1.77
11	417	442.7	-25.7	439.23	-22.23	449.8	-32.8	440.99	-23.99	413	4	450.03	-33.03
12	429	439.7	-10.7	434.48	-5.48	441.6	-12.6	430.78	-1.78	413	16	441.83	-12.83
13	427	403.2	23.8	402.92	24.08	404.4	22.6	399.91	27.09	415	12	406.63	20.37
14	365	320.9	44.1	328.51	36.49	325.2	39.8	328.55	36.45	419.75	-54.75	332.18	32.82
15	312	315.5	-3.5	319.17	-7.17	314.6	-2.6	316.36	-4.36	418.33	-106.33	320.16	-8.16
16	426	422.9	3.1	424.33	1.67	423.6	2.4	424.73	1.27	417.92	8.08	428.75	-2.75
17	366	355.4	10.6	365.41	.59	368.4	-2.4	374.05	-8.05	413.92	-47.92	369.55	-3.55
18	436	422.6	13.4	435	1	428	8	435.48	.52	414.58	21.42	429.81	6.19
19	408	409.1	-1.1	419.72	-11.72	414.6	-6.6	419.7	-11.7	413.83	-5.83	415.66	-7.66
20	469	494.3	-25.3	497.15	-28.15	493.25	-24.25	493	-24	410.67	58.33	491.15	-22.15
21	463	438.3	·24.7	445.42	17.58	444.8	18.2	447.75	15.25	413.75	49.25	445.78	17.22
22	474	438.3	35.7	455	19	445	29	456.38	17.62	416	58	448.23	25.77
23	460	442.7	17.3	456.79	3.21	449.8	10.2	457.23	2.77	419.58	40.42	456.61	3.39
24	440	439.7	.3	447.02	-7.02	441.6	-1.6	443.32	-3.32	420.5	19.5	449.33	-9.33
25	401	403.2	-2.2	408.33	-7.33	404.4	-3.4	405.32	-4.32	418.33	-17.33	409.96	-8.96
26	293	320.9	-27.9	320.65	-27.65	325.2	-32.2	320.69	-27.69	412.33	-119.33	324.76	-31.76
27	310	315.5	-5.5	311.31	-1.31	314.6	-4.6	308.5	1.5	412.17	-102.17	314	-4
28	374	422.9	-48.9	403.15	-29.15	423.6	-49.6	403.55	-29.55	407.83	-33.83	418.66	-44.66
29	374	355.4	18.6	343.25	30.75	368.4	5.6	351.88	22.12	408.5	-34.5	364.13	9.87
30	419	422.6	-3.6	411.65	7.35	428	-9	412.13	6.87	407.08	11.92	422.31	-3.31
31	426	409.1	16.9	403.64	22.36	414.6	11.4	403.62	22.38	408.58	17.42	410.41	15.59
32	506	494.3	11.7	488.07	17.93	493.25	12.75	483.92	22.08	411.67	94.33	492.15	13.85
33	415	438.3	-23.3	427.89	-12.89	444.8	-29.8	430.23	-15.23	407.67	7.33	439.7	-24.7
34	380	438.3	-58.3	417.07	-37.07	445	-65	410.45	-30.45	399.83	-19.83	432.06	-52.06
35	507	442.7	64.3	447.35	59.65	449.8	57.2	447.79	59.21	403.75	103.25	440.78	66.22
36	455	439.7	15.3	451.13	3.87	441.6	13.4	447.43	7.57	405	50	433.83	21.17
37	382	403.2	-21.2	409.67	-27.67	404.4	-22.4	406.65	-24.65	403.42	-21.42	395.05	-13.05
38	345	320.9	24.1	332.2	12.8	325.2	19.8	332.24	12.76	407.75	-62.75	320.18	24.82
39	297	315.5	-18.5	320.81	-23.81	314.6	-17.6	318	-21	406.67	-109.67	308.5	-11.5
40	462	422.9	39.1	432.47	29.53	423.6	38.4	432.87	29.13	414	48	424.83	37.17
41	363	355.4	7.6	367.81	-4.81	368.4	-5.4	376.45	-13.45	413.08	-50.08	368.71	-5.71
42	452	422.6	29.4	441	11	428	24	441.48	10.52	415.83	36.17	431.06	20.94
43	437	409.1	27.9	435.19	1.81	414.6	22.4	435.17	1.83	416.75	20.25	418.58	18.42
44	491	494.3	-3.3	517.6	-26.6	493.25	-2.25	513.45	-22.45	415.5	75.5	495.98	-4.98
45	508	438.3	69.7	475.07	32.93	444.8	63.2	477.41	30.59	423.25	84.75	455.28	52.72
46	497	438.3	58.7	475.89	21.11	445	52	477.27	19.73	433	64	465.23	31.77
47	462	442.7	19.3	485.42	-23.42	449.8	12.2	485.86	-23.86	429.25	32.75	466.28	-4.28
48	459	439.7	19.3	481.12	-22.12	441.6	17.4	477.42	-18.42	429.58	29.42	458.41	.59
49	409	403.2	5.8	433.1	-24.1	404.4	4.6	430.08	-21.08	431.83	-22.83	423.46	-14.46
50	315	320.9	-5.9	342.34	-27.34	325.2	-10.2	342.38	-27.38	429.33	-114.33	341.76	-26.76
51	325	315.5	9.5	327.08	-2.08	314.6	10.4	324.27	.73	431.67	-106.67	333.5	-8.5
52	425	422.9	2.1	430.96	-5.96	423.6	1.4	431.36	-6.36	428.58	-3.58	439.41	-14.41
53	325	355.4	-30.4	346.53	-21.53	368.4	-43.4	355.16	-30.16	425.42	-100.42	381.05	-56.05
54	405	422.6	-17.6	405.67	-.67	428	-23	406.15	-1.15	421.5	-16.5	436.73	-31.73
55	385	409.1	-24.1	383.74	1.26	414.6	-29.6	383.72	1.28	417.17	-32.17	419	-34
56	493.25	494.3	-1.05	464.12	29.13	493.25	0	459.97	33.28	417.35	75.9	497.83	-4.58
57	412	438.3	-26.3	407.93	4.07	444.8	-32.8	410.26	1.74	409.35	2.65	441.38	-29.38
58	427	438.3	-11.3	414.02	12.98	445	-18	415.4	11.6	403.52	23.48	435.75	-8.75
59	403	442.7	-39.7	412.26	-9.26	449.8	-46.8	412.7	-9.7	398.6	4.4	435.63	-32.63
60	425	439.7	-14.7	412.75	12.25	441.6	-16.6	409.05	15.95	395.77	29.23	424.6	.4
61		403.2		373.67		404.4		369.02		395.77		387.4	
62		320.9		288.8		325.2		286.99		395.77		308.2	
63		315.5		280.83		314.6		273.56		395.77		297.6	
64		422.9		385.66		423.6		379.73		395.77		406.6	
65		355.4		315.58		368.4		321.71		395.77		351.4	
66		422.6		380.21		428		378.48		395.77		411	

Table 55
Fitted and Forecasted Values from 6 Models for USAREUR Total

MACOM: USAREUR

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	357	353.8	3.2	362.92	-5.92	356.6	.4	359.79	-2.79	361.67	-4.67	364.58	-7.58
2	339	300.7	38.3	310.28	28.72	305	34	309.06	29.94	361.67	-22.67	312.98	26.02
3	295	268.8	26.2	278.84	16.16	283.8	11.2	288.73	6.27	361.67	-66.67	291.78	3.22
4	413	430.8	-17.8	441.29	-28.29	428	-15	433.8	-20.8	361.67	51.33	435.98	-22.98
5	358	345.3	12.7	356.25	1.75	351.8	6.2	358.48	-.48	361.67	-3.67	359.78	-1.78
6	362	370.3	-8.3	381.71	-19.71	375.4	-13.4	382.95	-20.95	361.67	.33	383.38	-21.38
7	387	352.9	34.1	364.76	22.24	355	32	363.42	23.58	361.67	25.33	362.98	24.02
8	384	371.6	12.4	383.92	.08	380	4	389.29	-5.29	361.67	22.33	387.98	-3.98
9	317	330.7	-13.7	343.47	-26.47	333.2	-16.2	343.36	-26.36	361.67	-44.67	341.18	-24.18
10	350	353.5	-3.5	366.73	-16.73	349.6	.4	360.64	-10.64	361.67	-11.67	357.58	-7.58
11	334	354.2	-20.2	367.89	-33.89	348.2	-14.2	360.11	-26.11	361.67	-27.67	356.18	-22.18
12	444	367.8	76.2	381.94	62.06	377.6	66.4	390.38	53.62	361.67	82.33	385.58	58.42
13	349	353.8	-4.8	361.69	-12.69	356.6	-7.6	363.52	-14.52	361	-12	363.92	-14.92
14	268	300.7	-32.7	300.27	-32.27	305	-37	303.3	-35.3	355.08	-87.08	306.4	-38.4
15	299	268.8	30.2	279.31	19.69	283.8	15.2	287.8	11.2	355.42	-56.42	285.53	13.47
16	377	430.8	-53.8	420	-43	428	-51	413.66	-36.66	352.42	24.58	426.73	-49.73
17	347	345.3	1.7	336.02	10.98	351.8	-4.8	337.67	9.33	351.5	-4.5	349.62	-2.62
18	405	370.3	34.7	369.19	35.81	375.4	29.6	368.77	36.23	355.08	49.92	376.8	28.2
19	340	352.9	-12.9	351.34	-11.34	355	-15	348.63	-8.63	351.17	-11.17	352.48	-12.48
20	360	371.6	-11.6	368.16	-8.16	380	-20	369.56	-9.56	349.17	10.83	375.48	-15.48
21	370	330.7	39.3	336.97	33.03	333.2	36.8	333	37	353.58	16.42	333.1	36.9
22	317	353.5	-36.5	346.78	-29.78	349.6	-32.6	339.9	-22.9	350.83	-33.83	346.75	-29.75
23	336	354.2	-18.2	338.38	-2.38	348.2	-12.2	333.85	2.15	351	-15	345.52	-9.52
24	388	367.8	20.2	370.19	17.81	377.6	10.4	378.62	9.38	346.33	41.67	370.25	17.75
25	315	353.8	-38.8	345.66	-30.66	356.6	-41.6	347.48	-32.48	343.5	-28.5	346.42	-31.42
26	320	300.7	19.3	295.81	24.19	305	15	298.84	21.16	347.83	-27.83	299.15	20.85
27	328	268.8	59.2	287.42	40.58	283.8	44.2	295.91	32.09	350.25	-22.25	280.37	47.63
28	401	430.8	-29.8	431.56	-30.56	428	-27	425.23	-24.23	352.25	48.75	426.57	-25.57
29	359	345.3	13.7	349.36	9.64	351.8	7.2	351.01	7.99	353.25	5.75	351.37	7.63
30	343	370.3	-27.3	370.61	-27.61	375.4	-32.4	370.19	-27.19	348.08	-5.08	369.8	-26.8
31	345	352.9	-7.9	349.63	-4.63	355	-10	346.93	-1.93	348.5	-3.5	349.82	-4.82
32	412	371.6	40.4	379.02	32.98	380	32	380.42	31.58	352.83	59.17	379.15	32.85
33	332	330.7	1.3	343.76	-11.76	333.2	-1.2	339.79	-7.79	349.67	-17.67	329.18	2.82
34	354	353.5	.5	360.79	-6.79	349.6	4.4	353.91	.09	352.75	1.25	348.67	5.33
35	348	354.2	-6.2	355.38	-7.38	348.2	-.2	350.85	-2.85	353.75	-5.75	348.27	-.27
36	383	367.8	15.2	375.11	7.89	377.6	5.4	383.55	-.55	353.33	29.67	377.25	5.75
37	423	353.8	69.2	373.53	49.47	356.6	66.4	375.35	47.65	362.33	60.67	365.25	57.75
38	316	300.7	15.3	322.48	-6.48	305	11	325.51	-9.51	362	-46	313.32	2.68
39	275	268.8	6.2	296.75	-21.75	283.8	-8.8	305.24	-30.24	357.58	-82.58	287.7	-12.7
40	540	430.8	109.2	482.5	57.5	428	112	476.16	63.84	369.17	170.83	443.48	96.52
41	375	345.3	29.7	399.21	-24.21	351.8	23.2	400.86	-25.86	370.5	4.5	368.62	6.38
42	409	370.3	38.7	421.62	-12.62	375.4	33.6	421.21	-12.21	376	33	397.72	11.28
43	350	352.9	-2.9	390.07	-40.07	355	-5	387.36	-37.36	376.42	-26.42	377.73	-27.73
44	414	371.6	42.4	415.83	-1.83	380	34	417.23	-3.23	376.58	37.42	402.9	11.1
45	316	330.7	-14.7	358.56	-42.56	333.2	-17.2	354.59	-38.59	375.25	-59.25	354.77	-38.77
46	374	353.5	20.5	375.84	-1.84	349.6	24.4	368.96	5.04	376.92	-2.92	372.83	1.17
47	358	354.2	3.8	364.22	-6.22	348.2	9.8	359.7	-1.7	377.75	-19.75	372.27	-14.27
48	306	367.8	-61.8	349.34	-43.34	377.6	-71.6	357.78	-51.78	371.33	-65.33	395.25	-89.25
49	339	353.8	-14.8	332.68	6.32	356.6	-17.6	334.51	4.49	364.33	-25.33	367.25	-28.25
50	282	300.7	-18.7	270.02	11.98	305	-23	273.04	8.96	361.5	-79.5	312.82	-30.82
51	222	268.8	-46.8	220.06	1.94	283.8	-61.8	228.55	-6.55	357.08	-135.08	287.2	-65.2
52	409	430.8	-21.8	390.58	18.42	428	-19	384.24	24.76	346.17	62.83	420.48	-11.48
53	320	345.3	-25.3	304.35	15.65	351.8	-31.8	306	14	341.58	-21.58	339.7	-19.7
54	358	370.3	-12.3	336.07	21.93	375.4	-17.4	335.65	22.35	337.33	20.67	359.05	-1.05
55	353	352.9	.1	324.08	28.92	355	-2	321.38	31.62	337.58	15.42	338.9	14.1
56	330	371.6	-41.6	343.33	-13.33	380	-50	344.73	-14.73	330.58	-.58	356.9	-26.9
57	331	330.7	.3	309.04	21.96	333.2	-2.2	305.08	25.92	331.83	-.83	311.35	19.65
58	353	353.5	-.5	343.51	9.49	349.6	3.4	336.63	16.37	330.08	22.92	326	27
59	365	354.2	10.8	357.24	7.76	348.2	16.8	352.71	12.29	330.67	34.33	325.18	39.82
60	367	367.8	-.8	369.24	-2.24	377.6	-10.6	377.67	-10.67	335.75	31.25	359.67	7.33
61		353.8		358.1		356.6		359.95		335.75		338.67	
62		300.7		307.86		305		311.62		335.75		287.07	
63		268.8		278.82		283.8		293.7		335.75		265.87	
64		430.8		443.67		428		441.17		335.75		410.07	
65		345.3		361.03		351.8		368.24		335.75		333.87	
66		370.3		388.89		375.4		395.12		335.75		357.47	

Table 56
Fitted and Forecasted Values from 6 Models for ARNG Total

MACOM: ARNG

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	87	84	3	72.89	14.11	84.4	2.6	76.83	10.17	174.83	-87.83	82.55	4.45
2	66	79.9	-13.9	71.1	-5.1	76.8	-10.8	70.27	-4.27	174.83	-108.83	74.95	-8.95
3	48	57	-9	50.5	-2.5	56	-8	50.51	-2.51	174.83	-126.83	54.15	-6.15
4	108	124.6	-16.6	120.4	-12.4	118.4	-10.4	113.95	-5.95	174.83	-66.83	116.55	-8.55
5	76	108.3	-32.3	106.4	-30.4	102	-26	98.59	-22.59	174.83	-98.83	100.15	-24.15
6	118	124.9	-6.9	125.31	-7.31	125.2	-7.2	122.83	-4.83	174.83	-56.83	123.35	-5.35
7	144	149.6	-5.6	152.31	-8.31	148.8	-4.8	147.47	-3.47	174.83	-30.83	146.95	-2.95
8	317	285.4	31.6	290.41	26.59	303.4	13.6	303.11	13.89	174.83	142.17	301.55	15.45
9	533	458.4	74.6	465.71	67.29	480.6	52.4	481.35	51.65	174.83	358.17	478.75	54.25
10	324	295.1	28.9	304.72	19.28	314	10	315.79	8.21	174.83	149.17	312.15	11.85
11	198	217.1	-19.1	229.02	-31.02	216.6	-18.6	219.43	-21.43	174.83	23.17	214.75	-16.75
12	79	95	-16	109.22	-30.22	94	-15	97.87	-18.87	174.83	-95.83	92.15	-13.15
13	97	84	13	101.84	-4.84	84.4	12.6	93.27	3.73	175.67	-78.67	83.38	13.62
14	93	79.9	13.1	98.18	-5.18	76.8	16.2	89.12	3.88	177.92	-84.92	78.03	14.97
15	64	57	7	73.7	-9.7	56	8	68.77	-4.77	179.25	-115.25	58.57	5.43
16	122	124.6	-2.6	135.81	-13.81	118.4	3.6	129.32	-7.32	180.42	-58.42	122.13	-.13
17	103	108.3	-5.3	108.47	-5.47	102	1	107.16	-4.16	182.67	-79.67	107.98	-4.98
18	129	124.9	4.1	120.79	8.21	125.2	3.8	127.52	1.48	183.58	-54.58	132.1	-3.1
19	144	149.6	-5.6	138.15	5.85	148.8	-4.8	145.72	-1.72	183.58	-39.58	155.7	-11.7
20	375	285.4	89.6	300.88	74.12	303.4	71.6	320.51	54.49	188.42	186.58	315.13	59.87
21	477	458.4	18.6	484.81	-7.81	480.6	-3.6	499.97	-22.97	183.75	293.25	487.67	-10.67
22	375	295.1	79.9	345.05	29.95	314	61	349.76	25.24	188	187	325.32	49.68
23	293	217.1	75.9	279.45	13.55	216.6	76.4	266.56	26.44	195.92	97.08	235.83	57.17
24	113	95	18	149.54	-36.54	94	19	138.19	-25.19	198.75	-85.75	116.07	-3.07
25	77	84	-7	126.89	-49.89	84.4	-7.4	118.32	-41.32	197.08	-120.08	104.8	-27.8
26	77	79.9	-2.9	113.13	-36.13	76.8	.2	104.07	-27.07	195.75	-118.75	95.87	-18.87
27	42	57	-15	76.6	-34.6	56	-14	71.67	-29.67	193.92	-151.92	73.23	-31.23
28	82	124.6	-42.6	121.68	-39.68	118.4	-36.4	115.98	-33.98	190.58	-108.58	132.3	-50.3
29	103	108.3	-5.3	94.94	8.06	102	1	93.63	9.37	190.58	-87.58	115.9	-12.9
30	121	124.9	-3.9	103.09	17.91	125.2	-4.2	109.81	11.19	189.92	-68.92	138.43	-17.43
31	141	149.6	-8.6	116.64	24.36	148.8	-7.8	124.2	16.8	189.67	-48.67	161.78	-20.78
32	312	285.4	26.6	267.65	44.35	303.4	8.6	287.28	24.72	184.42	127.58	311.13	.87
33	515	458.4	56.6	455.29	59.71	480.6	34.4	470.45	44.55	187.58	327.42	491.5	23.5
34	351	295.1	55.9	315.19	35.81	314	37	319.9	31.1	185.58	165.42	322.9	28.1
35	180	217.1	-37.1	233.22	-53.22	216.6	-36.6	220.33	-40.33	176.17	3.83	216.08	-36.08
36	96	95	1	113.08	-17.08	94	2	101.73	-5.73	174.75	-78.75	92.07	3.93
37	71	84	-13	96.4	-25.4	84.4	-13.4	87.84	-16.84	174.25	-103.25	81.97	-10.97
38	53	79.9	-26.9	83.43	-30.43	76.8	-23.8	74.37	-21.37	172.25	-119.25	72.37	-19.37
39	65	57	8	60.87	4.13	56	9	55.94	9.06	174.17	-109.17	53.48	11.52
40	134	124.6	9.4	123.73	10.27	118.4	15.6	118.04	15.96	178.5	-44.5	120.22	13.78
41	107	108.3	-1.3	103.75	3.25	102	5	102.44	4.56	178.83	-71.83	104.15	2.85
42	136	124.9	11.1	120.41	15.59	125.2	10.8	127.13	8.87	180.08	-44.08	128.6	7.4
43	167	149.6	17.4	145.66	21.34	148.8	18.2	153.23	13.77	182.25	-15.25	154.37	12.63
44	257	285.4	-28.4	273.38	-16.38	303.4	-46.4	293.01	-36.01	177.67	79.33	304.38	-47.38
45	484	458.4	25.6	461.33	22.67	480.6	3.4	476.49	7.51	175.08	308.92	479	5
46	265	295.1	-30.1	297.64	-32.64	314	-49	302.35	-37.35	167.92	97.08	305.23	-40.23
47	164	217.1	-53.1	200.27	-36.27	216.6	-52.6	187.38	-23.38	166.58	-2.58	206.5	-42.5
48	81	95	-14	77.3	3.7	94	-13	65.95	15.05	165.33	-84.33	82.65	-1.65
49	90	84	6	69.57	20.43	84.4	5.6	61	29	166.92	-76.92	74.63	15.37
50	95	79.9	15.1	68.37	26.63	76.8	18.2	59.31	35.69	170.42	-75.42	70.53	24.47
51	61	57	4	49.3	11.7	56	5	44.38	16.62	170.08	-109.08	49.4	11.6
52	146	124.6	21.4	126.25	19.75	118.4	27.6	120.56	25.44	171.08	-25.08	112.8	33.2
53	121	108.3	12.7	114.49	6.51	102	19	113.18	7.82	172.25	-51.25	97.57	23.43
54	122	124.9	-2.9	132.56	-10.56	125.2	-3.2	139.28	-17.28	171.08	-49.08	119.6	2.4
55	148	149.6	-1.6	160.7	-12.7	148.8	-.8	168.27	-20.27	169.5	-21.5	141.62	6.38
56	256	285.4	-29.4	284.84	-28.84	303.4	-47.4	304.47	-48.47	169.42	86.58	296.13	-40.13
57	394	458.4	-64.4	444.9	-50.9	480.6	-86.6	460.06	-66.06	161.92	232.08	465.83	-71.83
58	255	295.1	-40.1	270	-15	314	-59	274.71	-19.71	161.08	93.92	298.4	-43.4
59	248	217.1	30.9	197.89	50.11	216.6	31.4	185	63	168.08	79.92	208	40
60	101	95	6	77.62	23.38	94	7	66.27	34.73	169.75	-68.75	87.07	13.93
61		84		64.1		84.4		52.88		169.75		77.47	
62		79.9		57.48		76.8		41.5		169.75		69.87	
63		57		32.06		56		16.92		169.75		49.87	
64		124.6		97.14		118.4		75.54		169.75		111.47	
65		108.3		78.32		102		55.36		169.75		95.07	
66		124.9		92.4		125.2		74.78		169.75		118.27	

Table 57
Fitted and Forecasted Values from 6 Models for TRADOC Total

MACOM: TRADOC

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	181	148.6	32.4	167.02	13.98	157.8	23.2	169.15	11.85	164.67	16.33	173.08	7.92
2	144	131.8	12.2	150.75	-6.75	134.2	9.8	146.26	-2.26	164.67	-20.67	149.48	-5.48
3	90	91	-1	110.48	-20.48	94.8	-4.8	107.58	-17.58	164.67	-74.67	110.08	-20.08
4	183	151.9	31.1	171.91	11.09	158.4	24.6	171.89	11.11	164.67	18.33	173.68	9.32
5	152	136.5	15.5	157.03	-5.03	144.6	7.4	158.81	-6.81	164.67	-12.67	159.88	-7.88
6	176	147.9	28.1	168.96	7.04	155.8	20.2	170.73	5.27	164.67	11.33	171.08	4.92
7	158	129.7	28.3	151.29	6.71	140.2	17.8	155.84	2.16	164.67	-6.67	155.48	2.52
8	184	157.6	26.4	179.72	4.28	166.6	17.4	182.96	1.04	164.67	19.33	181.88	2.12
9	180	168.1	11.9	190.74	-10.74	169.2	10.8	186.27	-6.27	164.67	15.33	184.48	-4.48
10	172	160.6	11.4	183.77	-11.77	166.6	5.4	184.39	-12.39	164.67	7.33	181.88	-9.88
11	186	154.9	31.1	178.6	7.4	161.2	24.8	179.7	6.3	164.67	21.33	176.48	9.52
12	170	141.5	28.5	165.73	4.27	143.2	26.8	162.42	7.58	164.67	5.33	158.48	11.52
13	161	148.6	12.4	172.04	-11.04	157.8	3.2	174.77	-13.77	163	-2	171.42	-10.42
14	138	131.8	6.2	150.83	-12.83	134.2	3.8	147.64	-9.64	162.5	-24.5	147.32	-9.32
15	106	91	15	104.64	1.36	94.8	11.2	104.69	1.31	163.83	-57.83	109.25	-3.25
16	138	151.9	-13.9	157.17	-19.17	158.4	-20.4	159.71	-21.71	160.08	-22.08	169.1	-31.1
17	157	136.5	20.5	142.67	14.33	144.6	12.4	145.86	11.14	160.5	-3.5	155.72	1.28
18	169	147.9	21.1	157.06	11.94	155.8	13.2	159.19	9.81	159.92	9.08	166.33	2.67
19	143	129.7	13.3	139.85	3.15	140.2	2.8	142.52	.48	158.67	-15.67	149.48	-6.48
20	158	157.6	.4	165.19	-7.19	166.6	-8.6	165	-7	156.5	1.5	173.72	-15.72
21	163	168.1	-5.1	170.1	-7.1	169.2	-6.2	164.28	-1.28	155.08	7.92	174.9	-11.9
22	182	160.6	21.4	165.39	16.61	166.6	15.4	164.49	17.51	155.92	26.08	173.13	8.87
23	161	154.9	6.1	160.87	.13	161.2	-.2	160.15	.85	153.83	7.17	165.65	-4.65
24	131	141.5	-10.5	144.28	-13.28	143.2	-12.2	140.97	-9.97	150.58	-19.58	144.4	-13.4
25	154	148.6	5.4	151.69	2.31	157.8	-3.8	154.43	-.43	150	4	158.42	-4.42
26	128	131.8	-3.8	131.73	-3.73	134.2	-6.2	129.35	-1.35	149.17	-21.17	133.98	-5.98
27	99	91	8	93.11	5.89	94.8	4.2	93.15	5.85	148.58	-49.58	94	5
28	185	151.9	33.1	159.03	25.97	158.4	26.6	161.57	23.43	152.5	32.5	161.52	23.48
29	130	136.5	-6.5	140.9	-10.9	144.6	-14.6	144.09	-14.09	150.25	-20.25	145.47	-15.47
30	127	147.9	-20.9	146.47	-19.47	155.8	-28.8	148.6	-21.6	146.75	-19.75	153.17	-26.17
31	146	129.7	16.3	133.72	12.28	140.2	5.8	136.39	9.61	147	-1	137.82	8.18
32	181	157.6	23.4	166.9	14.1	166.6	14.4	166.7	14.3	148.92	32.08	166.13	14.87
33	182	168.1	13.9	178.07	3.93	169.2	12.8	172.26	9.74	150.5	31.5	170.32	11.68
34	170	160.6	9.4	173.61	-3.61	166.6	3.4	172.71	-2.71	149.5	20.5	166.72	3.28
35	151	154.9	-3.9	164.93	-13.93	161.2	-10.2	164.22	-13.22	148.67	2.33	160.48	-9.48
36	134	141.5	-7.5	145.11	-11.11	143.2	-9.2	141.8	-7.8	148.92	-14.92	142.73	-8.73
37	168	148.6	19.4	156.26	11.74	157.8	10.2	158.99	9.01	150.08	17.92	158.5	9.5
38	132	131.8	.2	135.77	-3.77	134.2	-2.2	133.39	-1.39	150.42	-18.42	135.23	-3.23
39	100	91	9	95.69	4.31	94.8	5.2	95.74	4.26	150.5	-50.5	95.92	4.08
40	158	151.9	6.1	160.61	-2.61	158.4	-.4	163.14	-5.14	148.25	9.75	157.27	.73
41	170	136.5	33.5	151.74	18.26	144.6	25.4	154.92	15.08	151.58	18.42	146.8	23.2
42	174	147.9	26.1	163.54	10.46	155.8	18.2	165.67	8.33	155.5	18.5	161.92	12.08
43	156	129.7	26.3	150.21	5.79	140.2	15.8	152.88	3.12	156.33	-.33	147.15	8.85
44	184	157.6	26.4	183.79	.21	166.6	17.4	183.6	.4	156.58	27.42	173.8	10.2
45	155	168.1	-13.1	186.64	-31.64	169.2	-14.2	180.82	-25.82	154.33	.67	174.15	-19.15
46	162	160.6	1.4	176.04	-14.04	166.6	-4.6	175.15	-13.15	153.67	8.33	170.88	-8.88
47	166	154.9	11.1	168.2	-2.2	161.2	4.8	167.49	-1.49	154.92	11.08	166.73	-.73
48	139	141.5	-2.5	147.47	-8.47	143.2	-4.2	144.16	-5.16	155.33	-16.33	149.15	-10.15
49	125	148.6	-23.6	145.31	-20.31	157.8	-32.8	148.04	-23.04	151.75	-26.75	160.17	-35.17
50	129	131.8	-2.8	123.84	5.16	134.2	-5.2	121.45	7.55	151.5	-22.5	136.32	-7.32
51	79	91	-12	77.23	1.77	94.8	-15.8	77.28	1.72	149.75	-70.75	95.17	-16.17
52	128	151.9	-23.9	129.14	-1.14	158.4	-30.4	131.68	-3.68	147.25	-19.25	156.27	-28.27
53	114	136.5	-22.5	110.89	3.11	144.6	-30.6	114.08	-.08	142.58	-28.58	137.8	-23.8
54	133	147.9	-14.9	122.6	10.4	155.8	-22.8	124.73	8.27	139.17	-6.17	145.58	-12.58
55	98	129.7	-31.7	101.36	-3.36	140.2	-42.2	104.03	-6.03	134.33	-36.33	125.15	-27.15
56	126	157.6	-31.6	128.5	-2.5	166.6	-40.6	128.31	-2.31	129.5	-3.5	146.72	-20.72
57	166	168.1	-2.1	142.58	23.42	169.2	-3.2	136.77	29.23	130.42	35.58	150.23	15.77
58	147	160.6	-13.6	137.27	9.73	166.6	-19.6	136.38	10.62	129.17	17.83	146.38	.62
59	142	154.9	-12.9	136.16	5.84	161.2	-19.2	135.45	6.55	127.17	14.83	138.98	3.02
60	142	141.5	.5	129.96	12.04	143.2	-1.2	126.65	15.35	127.42	14.58	121.23	20.77
61		148.6		137.85		157.8		142.23		127.42		135.83	
62		131.8		121.85		134.2		119.62		127.42		112.23	
63		91		81.85		94.8		81.2		127.42		72.83	
64		151.9		143.55		158.4		145.79		127.42		136.43	
65		136.5		128.94		144.6		132.97		127.42		122.63	
66		147.9		141.14		155.8		145.16		127.42		133.83	

Table 58
Fitted and Forecasted Values from 6 Models for USAISC Total

MACOM: USAISC

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	21	23.4	-2.4	20.68	.32	21.8	-.8	19.35	1.65	21.5	-.5	22.2	-1.2
2	20	24.9	-4.9	22.86	-2.86	23.2	-3.2	21.27	-1.27	21.5	-1.5	23.6	-3.6
3	16	14	2	12.65	3.35	15.6	.4	14.18	1.82	21.5	-5.5	16	0
4	15	23.4	-8.4	22.74	-7.74	22.8	-7.8	21.9	-6.9	21.5	-6.5	23.2	-8.2
5	18	16.4	1.6	16.43	1.57	18.6	-.6	18.22	-.22	21.5	-3.5	19	-1
6	32	22.3	9.7	23.01	8.99	24.6	7.4	24.74	7.26	21.5	10.5	25	7
7	21	20.6	.4	22	-1	21.6	-.6	22.26	-1.26	21.5	-.5	22	-1
8	22	19.7	2.3	21.79	.21	20.6	1.4	21.78	.22	21.5	.5	21	1
9	23	21.3	1.7	24.08	-1.08	22.2	.8	23.9	-.9	21.5	1.5	22.6	.4
10	23	17.1	5.9	20.57	2.43	18.8	4.2	21.02	1.98	21.5	1.5	19.2	3.8
11	19	20.4	-1.4	24.55	-5.55	20.8	-1.8	23.53	-4.53	21.5	-2.5	21.2	-2.2
12	28	21.8	6.2	26.64	1.36	22.6	5.4	25.85	2.15	21.5	6.5	23	5
13	21	23.4	-2.4	26.64	-5.64	21.8	-.8	24.5	-3.5	21.5	-.5	22.2	-1.2
14	19	24.9	-5.9	25.1	-6.1	23.2	-4.2	23.94	-4.94	21.42	-2.42	23.52	-4.52
15	20	14	6	15.85	4.15	15.6	4.4	17.56	2.44	21.75	-1.75	16.25	3.75
16	27	23.4	3.6	24.31	2.69	22.8	4.2	24.4	2.6	22.75	4.25	24.45	2.55
17	26	16.4	9.6	19.34	6.66	18.6	7.4	21.52	4.48	23.42	2.58	20.92	5.08
18	23	22.3	.7	25.69	-2.69	24.6	-1.6	27.21	-4.21	22.67	.33	26.17	-3.17
19	21	20.6	.4	23.15	-2.15	21.6	-.6	23.21	-2.21	22.67	-1.67	23.17	-2.17
20	19	19.7	-.7	21.4	-2.4	20.6	-1.6	21.25	-2.25	22.42	-3.42	21.92	-2.92
21	26	21.3	4.7	23.76	2.24	22.2	3.8	23.5	2.5	22.67	3.33	23.77	2.23
22	18	17.1	.9	19.78	-1.78	18.8	-.8	19.84	-1.84	22.25	-4.25	19.95	-1.95
23	21	20.4	.6	22.19	-1.19	20.8	.2	21.07	-.07	22.42	-1.42	22.12	-1.12
24	20	21.8	-1.8	23.18	-3.18	22.6	-2.6	22.39	-2.39	21.75	-1.75	23.25	-3.25
25	16	23.4	-7.4	21.59	-5.59	21.8	-5.8	19.45	-3.45	21.33	-5.33	22.03	-6.03
26	26	24.9	1.1	22.02	3.98	23.2	2.8	20.87	5.13	21.92	4.08	24.02	1.98
27	17	14	3	12.33	4.67	15.6	1.4	14.04	2.96	21.67	-4.67	16.17	.83
28	24	23.4	.6	21.94	2.06	22.8	1.2	22.03	1.97	21.42	2.58	23.12	.88
29	18	16.4	1.6	16.56	1.44	18.6	-.6	18.74	-.74	20.75	-2.75	18.25	-.25
30	27	22.3	4.7	23.82	3.18	24.6	2.4	25.34	1.66	21.08	5.92	24.58	2.42
31	23	20.6	2.4	22.6	.4	21.6	1.4	22.66	.34	21.25	1.75	21.75	1.25
32	20	19.7	.3	21.3	-1.3	20.6	-.6	21.15	-1.15	21.33	-1.33	20.83	-.83
33	20	21.3	-1.3	22.89	-2.89	22.2	-2.2	22.63	-2.63	20.83	-.83	21.93	-1.93
34	13	17.1	-4.1	17.45	-4.45	18.8	-5.8	17.51	-4.51	20.42	-7.42	18.12	-5.12
35	19	20.4	-1.4	20.44	-1.44	20.8	-1.8	19.32	-.32	20.25	-1.25	19.95	-.95
36	20	21.8	-1.8	21.1	-1.1	22.6	-2.6	20.32	-.32	20.25	-.25	21.75	-1.75
37	22	23.4	-1.4	21.14	.86	21.8	.2	19	3	20.75	1.25	21.45	.55
38	23	24.9	-1.9	22.13	.87	23.2	-.2	20.97	2.03	20.5	2.5	22.6	.4
39	15	14	1	11.99	3.01	15.6	-.6	13.7	1.3	20.33	-5.33	14.83	.17
40	24	23.4	.6	21.72	2.28	22.8	1.2	21.81	2.19	20.33	3.67	22.03	1.97
41	20	16.4	3.6	16.1	3.9	18.6	1.4	18.28	1.72	20.5	-.5	18	2
42	25	22.3	2.7	23.55	1.45	24.6	.4	25.07	-.07	20.33	4.67	23.83	1.17
43	27	20.6	6.4	24.19	2.81	21.6	5.4	24.25	2.75	20.67	6.33	21.17	5.83
44	26	19.7	6.3	25.09	.91	20.6	5.4	24.94	1.06	21.17	4.83	20.67	5.33
45	22	21.3	.7	26.35	-4.35	22.2	-.2	26.09	-4.09	21.33	.67	22.43	-.43
46	28	17.1	10.9	24.27	3.73	18.8	9.2	24.33	3.67	22.58	5.42	20.28	7.72
47	27	20.4	6.6	28.29	-1.29	20.8	6.2	27.17	-.17	23.25	3.75	22.95	4.05
48	25	21.8	3.2	29.04	-4.04	22.6	2.4	28.25	-3.25	23.67	1.33	25.17	-.17
49	29	23.4	5.6	30.57	-1.57	21.8	7.2	28.42	.58	24.25	4.75	24.95	4.05
50	28	24.9	3.1	30.91	-2.91	23.2	4.8	29.75	-1.75	24.67	3.33	26.77	1.23
51	10	14	-4	17.04	-7.04	15.6	-5.6	18.75	-8.75	24.25	-14.25	18.75	-8.75
52	24	23.4	.6	24.96	-.96	22.8	1.2	25.05	-1.05	24.25	-.25	25.95	-1.95
53	11	16.4	-5.4	15.21	-4.21	18.6	-7.6	17.39	-6.39	23.5	-12.5	21	-10
54	16	22.3	-6.3	18.29	-2.29	24.6	-8.6	19.82	-3.82	22.75	-6.75	26.25	-10.25
55	16	20.6	-4.6	15.24	.76	21.6	-5.6	15.3	.7	21.83	-5.83	22.33	-6.33
56	16	19.7	-3.7	13.66	2.34	20.6	-4.6	13.51	2.49	21	-5	20.5	-4.5
57	20	21.3	-1.3	14.73	5.27	22.2	-2.2	14.47	5.53	20.83	-.83	21.93	-1.93
58	12	17.1	-5.1	10.66	1.34	18.8	-6.8	10.72	1.28	19.5	-7.5	17.2	-5.2
59	18	20.4	-2.4	14.79	3.21	20.8	-2.8	13.67	4.33	18.75	-.75	18.45	-.45
60	20	21.8	-1.8	16.97	3.03	22.6	-2.6	16.19	3.81	18.33	1.67	19.83	.17
61		23.4		18.08		21.8		14.72		18.33		19.03	
62		24.9		19.09		23.2		15.46		18.33		20.43	
63		14		7.69		15.6		7.2		18.33		12.83	
64		23.4		16.6		22.8		13.74		18.33		20.03	
65		16.4		9.1		18.6		8.87		18.33		15.83	
66		22.3		14.51		24.6		14.21		18.33		21.83	

Table 59
Fitted and Forecasted Values from 6 Models for JAPAN Total

MACOM: JAPAN

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	4	1.6	2.4	2.93	1.07	2.2	1.8	3.39	.61	1.75	2.25	2.47	1.53
2	1	1.6	-.6	2.74	-1.74	1.4	-.4	2.42	-1.42	1.75	-.75	1.67	-.67
3	3	2.2	.8	3.15	-.15	2.2	.8	3.05	-.05	1.75	1.25	2.47	.53
4	2	2.1	-.1	2.86	-.86	1.8	.2	2.49	-.49	1.75	.25	2.07	-.07
5	2	1.2	.8	1.77	.23	1	1	1.52	.48	1.75	.25	1.27	.73
6	3	1	2	1.38	1.62	1.4	1.6	1.75	1.25	1.75	1.25	1.67	1.33
7	1	.5	.5	.69	.31	.6	.4	.78	.22	1.75	-.75	.87	.13
8	1	1.5	-.5	1.5	-.5	1.6	-.6	1.61	-.61	1.75	-.75	1.87	-.87
9	3	1.2	1.8	1.01	1.99	1.4	1.6	1.25	1.75	1.75	1.25	1.67	1.33
10	0	1.5	-1.5	1.12	-1.12	1.4	-1.4	1.08	-1.08	1.75	-1.75	1.67	-1.67
11	0	1.5	-1.5	.93	-.93	1.2	-1.2	.71	-.71	1.75	-1.75	1.47	-1.47
12	1	1.7	-.7	.94	.06	1.6	-.6	.94	.06	1.75	-.75	1.87	-.87
13	2	1.6	.4	1.23	.77	2.2	-.2	1.66	.34	1.58	.42	2.3	-.3
14	1	1.6	-.6	.9	.1	1.4	-.4	.63	.37	1.58	-.58	1.5	-.5
15	1	2.2	-1.2	1.22	-.22	2.2	-1.2	1.16	-.16	1.42	-.42	2.13	-1.13
16	1	2.1	-1.1	.81	.19	1.8	-.8	.59	.41	1.33	-.33	1.65	-.65
17	0	1.2	-1.2	0	.25	1	-1	0	.27	1.17	-1.17	.68	-.68
18	1	1	0	.02	.98	1.4	-.4	.43	.57	1	0	.92	.08
19	0	.5	-.5	0	.33	.6	-.6	0	.26	.92	-.92	.03	-.03
20	2	1.5	.5	.99	1.01	1.6	.4	1.02	.98	1	1	1.12	.88
21	1	1.2	-.2	1.14	-.14	1.4	-.4	1.19	-.19	.83	.17	.75	.25
22	1	1.5	-.5	1.34	-.34	1.4	-.4	1.14	-.14	.92	.08	.83	.17
23	1	1.5	-.5	1.19	-.19	1.2	-.2	.94	.06	1	0	.72	.28
24	2	1.7	.3	1.58	.42	1.6	.4	1.58	.42	1.08	.92	1.2	.8
25	3	1.6	1.4	2.14	.86	2.2	.8	2.57	.43	1.17	1.83	1.88	1.12
26	0	1.6	-1.6	1.71	-1.71	1.4	-1.4	1.44	-1.44	1.08	-1.08	1	-1
27	3	2.2	.8	2.52	.48	2.2	.8	2.46	.54	1.25	1.75	1.97	1.03
28	1	2.1	-1.1	2.01	-1.01	1.8	-.8	1.8	-.8	1.25	-.25	1.57	-.57
29	1	1.2	-.2	.95	.05	1	0	.94	.06	1.33	-.33	.85	.15
30	1	1	0	.81	.19	1.4	-.4	1.22	-.22	1.33	-.33	1.25	-.25
31	1	.5	.5	.44	.56	.6	.4	.51	.49	1.42	-.42	.53	.47
32	2	1.5	.5	1.69	.31	1.6	.4	1.73	.27	1.42	.58	1.53	.47
33	2	1.2	.8	1.62	.38	1.4	.6	1.67	.33	1.5	.5	1.42	.58
34	2	1.5	.5	1.97	.03	1.4	.6	1.77	.23	1.58	.42	1.5	.5
35	2	1.5	.5	1.98	.02	1.2	.8	1.73	.27	1.67	.33	1.38	.62
36	2	1.7	.3	2.22	-.22	1.6	.4	2.23	-.23	1.67	.33	1.78	.22
37	2	1.6	.4	2.38	-.38	2.2	-.2	2.82	-.82	1.58	.42	2.3	-.3
38	3	1.6	1.4	2.47	.53	1.4	1.6	2.21	.79	1.83	1.17	1.75	1.25
39	2	2.2	-.2	2.98	-.98	2.2	-.2	2.92	-.92	1.75	.25	2.47	-.47
40	2	2.1	-.1	2.54	-.54	1.8	.2	2.32	-.32	1.83	.17	2.15	-.15
41	0	1.2	-1.2	1.08	-1.08	1	-1	1.07	-1.07	1.75	-1.75	1.27	-1.27
42	2	1	1	1.04	.96	1.4	.6	1.45	.55	1.83	.17	1.75	.25
43	1	.5	.5	.61	.39	.6	.4	.68	.32	1.83	-.83	.95	.05
44	2	1.5	.5	1.67	.33	1.6	.4	1.7	.3	1.83	.17	1.95	.05
45	0	1.2	-1.2	.98	-.98	1.4	-1.4	1.03	-1.03	1.67	-1.67	1.58	-1.58
46	3	1.5	1.5	1.71	1.29	1.4	1.6	1.51	1.49	1.75	1.25	1.67	1.33
47	1	1.5	-.5	1.52	-.52	1.2	-.2	1.26	-.26	1.67	-.67	1.38	-.38
48	1	1.7	-.7	1.47	-.47	1.6	-.6	1.47	-.47	1.58	-.58	1.7	-.7
49	0	1.6	-1.6	.91	-.91	2.2	-2.2	1.34	-1.34	1.42	-1.42	2.13	-2.13
50	2	1.6	.4	1.28	.72	1.4	.6	1.02	.98	1.33	.67	1.25	.75
51	2	2.2	-.2	1.85	.15	2.2	-.2	1.79	.21	1.33	.67	2.05	-.05
52	3	2.1	.9	2.06	.94	1.8	1.2	1.85	1.15	1.42	1.58	1.73	1.27
53	2	1.2	.8	1.22	.78	1	1	1.21	.79	1.58	.42	1.1	.9
54	0	1	-1	.84	-.84	1.4	-1.4	1.25	-1.25	1.42	-1.42	1.33	-1.33
55	0	.5	-.5	.3	-.3	.6	-.6	.37	-.37	1.33	-1.33	.45	-.45
56	1	1.5	-.5	1.29	-.29	1.6	-.6	1.33	-.33	1.25	-.25	1.37	-.37
57	1	1.2	-.2	.84	.16	1.4	-.4	.88	.12	1.33	-.33	1.25	-.25
58	1	1.5	-.5	1.3	-.3	1.4	-.4	1.1	-.1	1.17	-.17	1.08	-.08
59	2	1.5	.5	1.5	.5	1.2	.8	1.25	.75	1.25	.75	.97	1.03
60	2	1.7	.3	1.77	.23	1.6	.4	1.78	.22	1.33	.67	1.45	.55
61		1.6		1.71		2.2		2.44		1.33		2.05	
62		1.6		1.75		1.4		1.7		1.33		1.25	
63		2.2		2.39		2.2		2.56		1.33		2.05	
64		2.1		2.33		1.8		2.21		1.33		1.65	
65		1.2		1.46		1		1.47		1.33		.85	
66		1		1.3		1.4		1.93		1.33		1.25	

Table 60
Fitted and Forecasted Values from 6 Models for AMC Total

MACOM: AMC

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	30	29.6	.4	34.4	-4.4	29.6	.4	32.26	-2.26	34.08	-4.08	25.53	4.47
2	30	26.5	3.5	29.91	.09	29.8	.2	31.23	-1.23	34.08	-4.08	25.73	4.27
3	30	31.7	-1.7	33.72	-3.72	32.6	-2.6	32.81	-2.81	34.08	-4.08	28.53	1.47
4	51	40.1	10.9	40.72	10.28	43.8	7.2	42.79	8.21	34.08	16.92	39.73	11.27
5	29	31.4	-2.4	30.63	-1.63	33.8	-4.8	31.57	-2.57	34.08	-5.08	29.73	-.73
6	36	35.2	.8	33.04	2.96	36.8	-.8	33.34	2.66	34.08	1.92	32.73	3.27
7	37	41.1	-4.1	37.55	-.55	40.6	-3.6	35.92	1.08	34.08	2.92	36.53	.47
8	31	38.8	-7.8	33.85	-2.85	40.8	-9.8	34.9	-3.9	34.08	-3.08	36.73	-5.73
9	35	40.8	-5.8	34.46	.54	40.2	-5.2	33.08	1.92	34.08	.92	36.13	-1.13
10	46	44.9	1.1	37.17	8.83	46.8	-.8	38.46	7.54	34.08	11.92	42.73	3.27
11	27	48.9	-21.9	39.77	-12.77	48.4	-21.4	38.83	-11.83	34.08	-7.08	44.33	-17.33
12	27	34.3	-7.3	23.78	3.22	34.6	-7.6	23.81	3.19	34.08	-7.08	30.53	-3.53
13	26	29.6	-3.6	19.41	6.59	29.6	-3.6	19.69	6.31	33.75	-7.75	25.2	.8
14	33	26.5	6.5	20.28	12.72	29.8	3.2	22.9	10.1	34	-1	25.65	7.35
15	25	31.7	-6.7	24.58	.42	32.6	-7.6	24.94	.06	33.58	-8.58	28.03	-3.03
16	36	40.1	-4.1	35.14	.86	43.8	-7.8	37.15	-1.15	32.33	3.67	37.98	-1.98
17	29	31.4	-2.4	27.46	1.54	33.8	-4.8	27.62	1.38	32.33	-3.33	27.98	1.02
18	28	35.2	-7.2	31.39	-3.39	36.8	-8.8	30.57	-2.57	31.67	-3.67	30.32	-2.32
19	24	41.1	-17.1	34	-10	40.6	-16.6	31.87	-7.87	30.58	-6.58	33.83	-9.83
20	47	38.8	8.2	35.75	11.25	40.8	6.2	35.76	11.24	31.92	15.08	34.57	12.43
21	35	40.8	-5.8	37.4	-2.4	40.2	-5.2	35.64	-.64	31.92	3.08	33.97	1.03
22	51	44.9	6.1	45.8	5.2	46.8	4.2	46.22	4.78	32.33	18.67	40.98	10.02
23	44	48.9	-4.9	46.83	-2.83	48.4	-4.4	45.64	-1.64	33.75	10.25	44	0
24	36	34.3	1.7	32.99	3.01	34.6	1.4	33.02	2.98	34.5	1.5	30.95	5.05
25	32	29.6	2.4	29.52	2.48	29.6	2.4	29.81	2.19	35	-3	26.45	5.55
26	34	26.5	7.5	30.61	3.39	29.8	4.2	33.23	.77	35.08	-1.08	26.73	7.27
27	50	31.7	18.3	40.95	9.05	32.6	17.4	41.31	8.69	37.17	12.83	31.62	18.38
28	47	40.1	6.9	50.6	-3.6	43.8	3.2	52.61	-5.61	38.08	8.92	43.73	3.27
29	43	31.4	11.6	44.39	-1.39	33.8	9.2	44.55	-1.55	39.25	3.75	34.9	8.1
30	47	35.2	11.8	49.41	-2.41	36.8	10.2	48.59	-1.59	40.83	6.17	39.48	7.52
31	49	41.1	7.9	52.99	-3.99	40.6	8.4	50.86	-1.86	42.92	6.08	45.37	3.63
32	35	38.8	-3.8	48.18	-13.18	40.8	-5.8	48.18	-13.18	41.92	-6.92	44.57	-9.57
33	48	40.8	7.2	49.04	-1.04	40.2	7.8	47.28	.72	43	5	45.05	2.95
34	56	44.9	11.1	54.63	1.37	46.8	9.2	55.05	.95	43.42	12.58	52.07	3.93
35	58	48.9	9.1	57.51	.49	48.4	9.6	56.32	1.68	44.58	13.42	54.83	3.17
36	43	34.3	8.7	42.23	.77	34.6	8.4	42.26	.74	45.17	-2.17	41.62	1.38
37	32	29.6	2.4	34.84	-2.84	29.6	2.4	35.13	-3.13	45.17	-13.17	36.62	-4.62
38	37	26.5	10.5	32.29	4.71	29.8	7.2	34.91	2.09	45.42	-8.42	37.07	-.07
39	35	31.7	3.3	37.6	-2.6	32.6	2.4	37.97	-2.97	44.17	-9.17	38.62	-3.62
40	60	40.1	19.9	49.69	10.31	43.8	16.2	51.7	8.3	45.25	14.75	50.9	9.1
41	51	31.4	19.6	44.87	6.13	33.8	17.2	45.03	5.97	45.92	5.08	41.57	9.43
42	49	35.2	13.8	50.56	-1.56	36.8	12.2	49.74	-.74	46.08	2.92	44.73	4.27
43	60	41.1	18.9	59.13	.87	40.6	19.4	57	3	47	13	49.45	10.55
44	62	38.8	23.2	58.39	3.61	40.8	21.2	58.4	3.6	49.25	12.75	51.9	10.1
45	45	40.8	4.2	57.15	-12.15	40.2	4.8	55.39	-10.39	49	-4	51.05	-6.05
46	42	44.9	-2.9	56.68	-14.68	46.8	-4.8	57.1	-15.1	47.83	-5.83	56.48	-14.48
47	75	48.9	26.1	64.87	10.13	48.4	26.6	63.68	11.32	49.25	25.75	59.5	15.5
48	37	34.3	2.7	46.83	-9.83	34.6	2.4	46.86	-9.86	48.75	-11.75	45.2	-8.2
49	28	29.6	-1.6	36.61	-8.61	29.6	-1.6	36.9	-8.9	48.42	-20.42	39.87	-11.87
50	15	26.5	-11.5	26.57	-11.57	29.8	-14.8	29.19	-14.19	46.58	-31.58	38.23	-23.23
51	23	31.7	-8.7	25.31	-2.31	32.6	-9.6	25.67	-2.67	45.58	-22.58	40.03	-17.03
52	25	40.1	-15.1	28.58	-3.58	43.8	-18.8	30.6	-5.6	42.67	-17.67	48.32	-23.32
53	17	31.4	-14.4	16.26	.74	33.8	-16.8	16.43	.57	39.83	-22.83	35.48	-18.48
54	24	35.2	-11.2	17.73	6.27	36.8	-12.8	16.91	7.09	37.75	-13.75	36.4	-12.4
55	33	41.1	-8.1	24.01	8.99	40.6	-7.6	21.88	11.12	35.5	-2.5	37.95	-4.95
56	29	38.8	-9.8	23.36	5.64	40.8	-11.8	23.36	5.64	32.75	-3.75	35.4	-6.4
57	38	40.8	-2.8	27.17	10.83	40.2	-2.2	25.41	12.59	32.17	5.83	34.22	3.78
58	39	44.9	-5.9	31.25	7.75	46.8	-7.8	31.67	7.33	31.92	7.08	40.57	-1.57
59	38	48.9	-10.9	38.7	-.7	48.4	-10.4	37.51	.49	28.83	9.17	39.08	-1.08
60	30	34.3	-4.3	27.03	2.97	34.6	-4.6	27.05	2.95	28.25	1.75	24.7	5.3
61		29.6		22.58		29.6		22.48		28.25		19.7	
62		26.5		19.74		29.8		23.11		28.25		19.9	
63		31.7		25.2		32.6		26.34		28.25		22.7	
64		40.1		33.86		43.8		37.97		28.25		33.9	
65		31.4		25.41		33.8		28.39		28.25		23.9	
66		35.2		29.47		36.8		31.82		28.25		26.9	

Table 61
Fitted and Forecasted Values from 6 Models for HSC Total

MACOM: HSC

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	16	23.9	-7.9	18.02	-2.02	23.4	-7.4	17.63	-1.63	20.42	-4.42	22.23	-6.23
2	14	16.2	-2.2	11.27	2.73	16.8	-2.8	11.87	2.13	20.42	-6.42	15.63	-1.63
3	14	16.8	-2.8	12.81	1.19	15.8	-1.8	11.71	2.29	20.42	-6.42	14.63	-.63
4	15	18	-3	14.95	.05	19	-4	15.74	-.74	20.42	-5.42	17.83	-2.83
5	24	22.9	1.1	20.8	3.2	24.6	-.6	22.18	1.82	20.42	3.58	23.43	.57
6	19	23.8	-4.8	22.64	-3.64	23.6	-4.6	22.02	-3.02	20.42	-1.42	22.43	-3.43
7	18	23.2	-5.2	22.99	-4.99	23.4	-5.4	22.65	-4.65	20.42	-2.42	22.23	-4.23
8	25	30.1	-5.1	30.83	-5.83	29.4	-4.4	29.49	-4.49	20.42	4.58	28.23	-3.23
9	25	17.7	7.3	19.38	5.62	19	6	19.92	5.08	20.42	4.58	17.83	7.17
10	32	20.6	11.4	23.22	8.78	22.4	9.6	24.16	7.84	20.42	11.58	21.23	10.77
11	20	19.3	.7	22.87	-2.87	19.8	.2	22.4	-2.4	20.42	-.42	18.63	1.37
12	23	20.7	2.3	25.21	-2.21	21.8	1.2	25.23	-2.23	20.42	2.58	20.63	2.37
13	29	23.9	5.1	28.92	.08	23.4	5.6	27.79	1.21	21.5	7.5	23.32	5.68
14	18	16.2	1.8	21.19	-3.19	16.8	1.2	21.12	-3.12	21.83	-3.83	17.05	.95
15	16	16.8	-.8	20.75	-4.75	15.8	.2	19.76	-3.76	22	-6	16.22	-.22
16	21	18	3	21.92	-.92	19	2	22.69	-1.69	22.5	-1.5	19.92	1.08
17	33	22.9	10.1	29.34	3.66	24.6	8.4	30.24	2.76	23.25	9.75	26.27	6.73
18	31	23.8	7.2	30.57	.43	23.6	7.4	29.89	1.11	24.25	6.75	26.27	4.73
19	26	23.2	2.8	28.47	-2.47	23.4	2.6	28.33	-2.33	24.92	1.08	26.73	-.73
20	26	30.1	-4.1	31.55	-5.55	29.4	-3.4	31.05	-5.05	25	1	32.82	-6.82
21	14	17.7	-3.7	17.48	-3.48	19	-5	18.6	-4.6	24.08	-10.08	21.5	-7.5
22	18	20.6	-2.6	20.14	-2.14	22.4	-4.4	21.15	-3.15	22.92	-4.92	23.73	-5.73
23	19	19.3	-.3	18.03	.97	19.8	-.8	17.73	1.27	22.83	-3.83	21.05	-2.05
24	24	20.7	3.3	19.98	4.02	21.8	2.2	20	4	22.92	1.08	23.13	.87
25	23	23.9	-.9	22.93	.07	23.4	-.4	21.8	1.2	22.42	.58	24.23	-1.23
26	21	16.2	4.8	16.34	4.66	16.8	4.2	16.26	4.74	22.67	-1.67	17.88	3.12
27	17	16.8	.2	16.14	.86	15.8	1.2	15.14	1.86	22.75	-5.75	16.97	.03
28	21	18	3	17.96	3.04	19	2	18.73	2.27	22.75	-1.75	20.17	.83
29	22	22.9	-.9	23.52	-1.52	24.6	-2.6	24.42	-2.42	21.83	.17	24.85	-2.85
30	16	23.8	-7.8	22.98	-6.98	23.6	-7.6	22.3	-6.3	20.58	-4.58	22.6	-6.6
31	28	23.2	4.8	24.5	3.5	23.4	4.6	24.35	3.65	20.75	7.25	22.57	5.43
32	33	30.1	2.9	31.73	1.27	29.4	3.6	31.23	1.77	21.33	11.67	29.15	3.85
33	20	17.7	2.3	19.29	.71	19	1	20.41	-.41	21.83	-1.83	19.25	.75
34	23	20.6	2.4	22.12	.88	22.4	.6	23.14	-.14	22.25	.75	23.07	-.07
35	18	19.3	-1.3	19.86	-1.86	19.8	-1.8	19.56	-1.56	22.17	-4.17	20.38	-2.38
36	21	20.7	.3	21.41	-.41	21.8	-.8	21.43	-.43	21.92	-.92	22.13	-1.13
37	24	23.9	.1	24.11	-.11	23.4	.6	22.98	1.02	22	2	23.82	.18
38	18	16.2	1.8	17.32	.68	16.8	1.2	17.24	.76	21.75	-3.75	16.97	1.03
39	12	16.8	-4.8	16.24	-4.24	15.8	-3.8	15.25	-3.25	21.33	-9.33	15.55	-3.55
40	25	18	7	19.9	5.1	19	6	20.66	4.34	21.67	3.33	19.08	5.92
41	24	22.9	1.1	24.71	-.71	24.6	-.6	25.62	-1.62	21.83	2.17	24.85	-.85
42	26	23.8	2.2	24.62	1.38	23.6	2.4	23.94	2.06	22.67	3.33	24.68	1.32
43	24	23.2	.8	24.33	-.33	23.4	.6	24.18	-.18	22.33	1.67	24.15	-.15
44	34	30.1	3.9	32.3	1.7	29.4	4.6	31.79	2.21	22.42	11.58	30.23	3.77
45	23	17.7	5.3	21.24	1.76	19	4	22.36	.64	22.67	.33	20.08	2.92
46	23	20.6	2.4	24.52	-1.52	22.4	.6	25.53	-2.53	22.67	.33	23.48	-.48
47	25	19.3	5.7	23.96	1.04	19.8	5.2	23.67	1.33	23.25	1.75	21.47	3.53
48	23	20.7	2.3	25.1	-2.1	21.8	1.2	25.12	-2.12	23.42	-.42	23.63	-.63
49	25	23.9	1.1	27.57	-2.57	23.4	1.6	26.44	-1.44	23.5	1.5	25.32	-.32
50	13	16.2	-3.2	18.12	-5.12	16.8	-3.8	18.04	-5.04	23.08	-10.08	18.3	-5.3
51	20	16.8	3.2	17.95	2.05	15.8	4.2	16.95	3.05	23.75	-3.75	17.97	2.03
52	13	18	-5	17.62	-4.62	19	-6	18.38	-5.38	22.75	-9.75	20.17	-7.17
53	20	22.9	-2.9	21.08	-1.08	24.6	-4.6	21.99	-1.99	22.42	-2.42	25.43	-5.43
54	26	23.8	2.2	22.39	3.61	23.6	2.4	21.71	4.29	22.42	3.58	24.43	1.57
55	21	23.2	-2.2	20.67	.33	23.4	-2.4	20.52	.48	22.17	-1.17	23.98	-2.98
56	29	30.1	-1.1	27.4	1.6	29.4	-.4	26.9	2.1	21.75	7.25	29.57	-.57
57	13	17.7	-4.7	14.2	-1.2	19	-6	15.32	-2.32	20.92	-7.92	18.33	-5.33
58	16	20.6	-4.6	16.23	-.23	22.4	-6.4	17.24	-1.24	20.33	-4.33	21.15	-5.15
59	17	19.3	-2.3	15.55	1.45	19.8	-2.8	15.26	1.74	19.67	-2.67	17.88	-.88
60	18	20.7	-2.7	17.2	.8	21.8	-3.8	17.22	.78	19.25	-1.25	19.47	-1.47
61		23.9		20.1		23.4		18.41		19.25		21.07	
62		16.2		12.1		16.8		11.4		19.25		14.47	
63		16.8		12.4		15.8		10		19.25		13.47	
64		18		13.3		19		12.79		19.25		16.67	
65		22.9		17.9		24.6		17.98		19.25		22.27	
66		23.8		18.5		23.6		16.57		19.25		21.27	

Table 62
Fitted and Forecasted Values from 6 Models for 8TH ARMY Total

MACOM: 8TH ARMY

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	24	22.5	1.5	19.13	4.87	25	-1	20.11	3.89	27.67	-3.67	27.53	-3.53
2	28	23.3	4.7	21.23	6.77	26.4	1.6	22.86	5.14	27.67	.33	28.93	-.93
3	15	23	-8	22.23	-7.23	23.6	-8.6	21.41	-6.41	27.67	-12.67	26.13	-11.13
4	25	25.2	-.2	25.73	-.73	25.4	-.4	24.56	.44	27.67	-2.67	27.93	-2.93
5	25	28.8	-3.8	30.63	-5.63	29.2	-4.2	29.71	-4.71	27.67	-2.67	31.73	-6.73
6	35	32.7	2.3	35.83	-.83	33.2	1.8	35.06	-.06	27.67	7.33	35.73	-.73
7	32	23.7	8.3	28.13	3.87	25.2	6.8	28.41	3.59	27.67	4.33	27.73	4.27
8	24	23.5	.5	29.23	-5.23	25.4	-1.4	29.96	-5.96	27.67	-3.67	27.93	-3.93
9	28	21.7	6.3	28.73	-.73	22.4	5.6	28.31	-.31	27.67	.33	24.93	3.07
10	33	24.1	8.9	32.43	.57	24.6	8.4	31.86	1.14	27.67	5.33	27.13	5.87
11	28	21.5	6.5	31.13	-3.13	21.6	6.4	30.21	-2.21	27.67	.33	24.13	3.87
12	35	16.6	18.4	27.53	7.47	19.6	15.4	29.56	5.44	27.67	7.33	22.13	12.87
13	37	22.5	14.5	36.21	.79	25	12	37.16	-.16	28.75	8.25	28.62	8.38
14	35	23.3	11.7	39	-4	26.4	8.6	39.69	-4.69	29.33	5.67	30.6	4.4
15	37	23	14	38.98	-1.98	23.6	13.4	37.47	-.47	31.17	5.83	29.63	7.37
16	21	25.2	-4.2	36.55	-15.55	25.4	-4.4	35.12	-14.12	30.83	-9.83	31.1	-10.1
17	33	28.8	4.2	37.54	-4.54	29.2	3.8	36.71	-3.71	31.5	1.5	35.57	-2.57
18	40	32.7	7.3	40.46	-.46	33.2	6.8	40.08	-.08	31.92	8.08	39.98	.02
19	25	23.7	1.3	29.52	-4.52	25.2	-.2	30.02	-5.02	31.33	-6.33	31.4	-6.4
20	35	23.5	11.5	29.36	5.64	25.4	9.6	29.96	5.04	32.25	2.75	32.52	2.48
21	29	21.7	7.3	26.9	2.1	22.4	6.6	26.55	2.45	32.33	-3.33	29.6	-.6
22	24	24.1	-.1	26.85	-2.85	24.6	-.6	26.65	-2.65	31.58	-7.58	31.05	-7.05
23	19	21.5	-2.5	21.05	-2.05	21.6	-2.6	20.98	-1.98	30.83	-11.83	27.3	-8.3
24	23	16.6	6.4	17.89	5.11	19.6	3.4	19.92	3.08	29.83	-6.83	24.3	-1.3
25	29	22.5	6.5	25.38	3.62	25	4	26.33	2.67	29.17	-.17	29.03	-.03
26	19	23.3	-4.3	24.42	-5.42	26.4	-7.4	25.12	-6.12	27.83	-8.83	29.1	-10.1
27	24	23	1	24.93	-.93	23.6	.4	23.42	.58	26.75	-2.75	25.22	-1.22
28	25	25.2	-.2	25.05	-.05	25.4	-.4	23.62	1.38	27.08	-2.08	27.35	-2.35
29	30	28.8	1.2	28.22	1.78	29.2	.8	27.39	2.61	26.83	3.17	30.9	-.9
30	29	32.7	-3.7	30.89	-1.89	33.2	-4.2	30.5	-1.5	25.92	3.08	33.98	-4.98
31	23	23.7	-.7	20.96	2.04	25.2	-2.2	21.46	1.54	25.75	-2.75	25.82	-2.82
32	21	23.5	-2.5	21.08	-.08	25.4	-4.4	21.68	-.68	24.58	-3.58	24.85	-3.85
33	21	21.7	-.7	19.96	1.04	22.4	-1.4	19.62	1.38	23.92	-2.92	21.18	-.18
34	22	24.1	-2.1	21.71	.29	24.6	-2.6	21.51	.49	23.75	-1.75	23.22	-1.22
35	21	21.5	-.5	18.61	2.39	21.6	-.6	18.54	2.46	23.92	-2.92	20.38	.62
36	15	16.6	-1.6	14.29	.71	19.6	-4.6	16.31	-1.31	23.25	-8.25	17.72	-2.72
37	17	22.5	-5.5	19.94	-2.94	25	-8	20.89	-3.89	22.25	-5.25	22.12	-5.12
38	34	23.3	10.7	23.94	10.06	26.4	7.6	24.63	9.37	23.5	10.5	24.77	9.23
39	19	23	-4	22.8	-3.8	23.6	-4.6	21.29	-2.29	23.08	-4.08	21.55	-2.55
40	34	25.2	8.8	27.93	6.07	25.4	8.6	26.51	7.49	23.83	10.17	24.1	9.9
41	31	28.8	2.2	32.4	-1.4	29.2	1.8	31.57	-.57	23.92	7.08	27.98	3.02
42	27	32.7	-5.7	33.99	-6.99	33.2	-6.2	33.61	-6.61	23.75	3.25	31.82	-4.82
43	25	23.7	1.3	25.32	-.32	25.2	-.2	25.82	-.82	23.92	1.08	23.98	1.02
44	27	23.5	3.5	25.72	1.28	25.4	1.6	26.32	.68	24.42	2.58	24.68	2.32
45	9	21.7	-12.7	19.81	-10.81	22.4	-13.4	19.46	-10.46	23.42	-14.42	20.68	-11.68
46	18	24.1	-6.1	20.28	-2.28	24.6	-6.6	20.08	-2.08	23.08	-5.08	22.55	-4.55
47	17	21.5	-4.5	16.64	.36	21.6	-4.6	16.57	.43	22.75	-5.75	19.22	-2.22
48	11	16.6	-5.6	10.34	.66	19.6	-8.6	12.36	-1.36	22.42	-11.42	16.88	-5.88
49	18	22.5	-4.5	14.67	3.33	25	-7	15.62	2.38	22.5	-4.5	22.37	-4.37
50	16	23.3	-7.3	15.74	.26	26.4	-10.4	16.44	-.44	21	-5	22.27	-6.27
51	23	23	0	16.11	6.89	23.6	-.6	14.6	8.4	21.33	1.67	19.8	3.2
52	22	25.2	-3.2	20.01	1.99	25.4	-3.4	18.58	3.42	20.33	1.67	20.6	1.4
53	27	28.8	-1.8	25.08	1.92	29.2	-2.2	24.25	2.75	20	7	24.07	2.93
54	35	32.7	2.3	30.5	4.5	33.2	1.8	30.12	4.88	20.67	14.33	28.73	6.27
55	21	23.7	-2.7	22.41	-1.41	25.2	-4.2	22.91	-1.91	20.33	.67	20.4	.6
56	20	23.5	-3.5	23.4	-3.4	25.4	-5.4	24	-4	19.75	.25	20.02	-.02
57	25	21.7	3.3	22.36	2.64	22.4	2.6	22.02	2.98	21.08	3.92	18.35	6.65
58	26	24.1	1.9	25.6	.4	24.6	1.4	25.4	.6	21.75	4.25	21.22	4.78
59	23	21.5	1.5	23.67	-.67	21.6	1.4	23.61	-.61	22.25	.75	18.72	4.28
60	14	16.6	-2.6	17.83	-3.83	19.6	-5.6	19.85	-5.85	22.5	-8.5	16.97	-2.97
61		22.5		24.2		25		25.78		22.5		22.37	
62		23.3		25.48		26.4		27.7		22.5		23.77	
63		23		25.65		23.6		25.42		22.5		20.97	
64		25.2		28.33		25.4		27.75		22.5		22.77	
65		28.8		32.4		29.2		32.07		22.5		26.57	
66		32.7		36.78		33.2		36.6		22.5		30.57	

Table 63
Fitted and Forecasted Values from 6 Models for HQDA Total

MACOM: HODA

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	35	44.3	-9.3	34.13	.87	41.6	-6.6	34.29	.71	37.75	-2.75	37.25	-2.25
2	33	39.3	-6.3	29.85	3.15	39	-6	32.23	.77	37.75	-4.75	34.65	-1.65
3	42	53.4	-11.4	44.67	-2.67	48.8	-6.8	42.57	-.57	37.75	4.25	44.45	-2.45
4	48	56.6	-8.6	48.59	-.59	53.8	-5.8	48.11	-.11	37.75	10.25	49.45	-1.45
5	39	46.9	-7.9	39.62	-.62	43.6	-4.6	38.44	.56	37.75	1.25	39.25	-.25
6	36	45.2	-9.2	38.64	-2.64	43	-7	38.38	-2.38	37.75	-1.75	38.65	-2.65
7	37	40	-3	34.16	2.84	39.8	-2.8	35.72	1.28	37.75	-.75	35.45	1.55
8	34	43.6	-9.6	38.48	-4.48	42.4	-8.4	38.86	-4.86	37.75	-3.75	38.85	-4.85
9	36	39.9	-3.9	35.51	.49	38	-2	34.99	1.01	37.75	-1.75	33.65	2.35
10	46	48.3	-2.3	44.63	1.37	45.4	.6	42.93	3.07	37.75	8.25	41.05	4.95
11	38	33.6	4.4	30.65	7.35	35.2	2.8	33.27	4.73	37.75	.25	30.85	7.15
12	29	36.3	-7.3	34.07	-5.07	34.6	-5.6	33.21	-4.21	37.75	-8.75	30.25	-1.25
13	32	44.3	-12.3	39.76	-7.76	41.6	-9.6	38.28	-6.28	37.5	-5.5	37	-5
14	42	39.3	2.7	37.48	4.52	39	3	37.69	4.31	38.25	3.75	35.15	6.85
15	36	53.4	-17.4	47.18	-11.18	48.8	-12.8	44.36	-8.36	37.75	-1.75	44.45	-8.45
16	50	56.6	-6.6	49.86	.14	53.8	-3.8	49.28	.72	37.92	12.08	49.62	.38
17	32	46.9	-14.9	37.24	-5.24	43.6	-11.6	36.83	-4.83	37.33	-5.33	38.83	-6.83
18	42	45.2	-3.2	36.11	5.89	43	-1	36.96	5.04	37.83	4.17	38.73	3.27
19	33	40	-7	31.17	1.83	39.8	-6.8	33.26	-.26	37.5	-4.5	35.2	-2.2
20	42	43.6	-1.6	35.68	6.32	42.4	-.4	36.47	5.53	38.17	3.83	38.47	3.53
21	33	39.9	-6.9	31.96	1.04	38	-5	32.07	.93	37.92	-4.92	33.82	-.82
22	41	48.3	-7.3	40.61	.39	45.4	-4.4	40.21	.79	37.5	3.5	40.8	.2
23	32	33.6	-1.6	29.15	2.85	35.2	-3.2	31.65	.35	37	-5	30.1	1.9
24	28	36.3	-8.3	31.39	-3.39	34.6	-6.6	30.53	-2.53	36.92	-8.92	29.42	-1.42
25	33	44.3	-11.3	37.26	-4.26	41.6	-8.6	35.78	-2.78	37	-4	36.5	-3.5
26	41	39.3	1.7	36.42	4.58	39	2	36.63	4.37	36.92	4.08	33.82	7.18
27	59	53.4	5.6	52.51	6.49	48.8	10.2	49.69	9.31	38.83	20.17	45.53	13.47
28	39	56.6	-17.6	51.79	-12.79	53.8	-14.8	51.21	-12.21	37.92	1.08	49.62	-10.62
29	34	46.9	-12.9	38.58	-4.58	43.6	-9.6	38.17	-4.17	38.08	-4.08	39.58	-5.58
30	45	45.2	-.2	39	6	43	2	39.85	5.15	38.33	6.67	39.23	5.77
31	46	40	6	36.99	9.01	39.8	6.2	39.08	6.92	39.42	6.58	37.12	8.88
32	55	43.6	11.4	45.78	9.22	42.4	12.6	46.57	8.43	40.5	14.5	40.8	14.2
33	39	39.9	-.9	42.26	-3.26	38	1	42.37	-3.37	41	-2	36.9	2.1
34	40	48.3	-8.3	48.36	-8.36	45.4	-5.4	47.95	-7.95	40.92	-.92	44.22	-4.22
35	35	33.6	1.4	35.2	-.2	35.2	-.2	37.71	-2.71	41.17	-6.17	34.27	.73
36	39	36.3	2.7	38.6	.4	34.6	4.4	37.73	1.27	42.08	-3.08	34.58	4.42
37	61	44.3	16.7	50.5	10.5	41.6	19.4	49.03	11.97	44.42	16.58	43.92	17.08
38	40	39.3	.7	45.78	-5.78	39	1	45.99	-5.99	44.33	-4.33	41.23	-1.23
39	45	53.4	-8.4	58.16	-13.16	48.8	-3.8	55.34	-10.34	43.17	1.83	49.87	-4.87
40	69	56.6	12.4	62.44	6.56	53.8	15.2	61.86	7.14	45.67	23.33	57.37	11.63
41	61	46.9	14.1	53.96	7.04	43.6	17.4	53.54	7.46	47.92	13.08	49.42	11.58
42	42	45.2	-3.2	49.45	-7.45	43	-1	50.3	-8.3	47.67	-5.67	48.57	-6.57
43	47	40	7	45.6	1.4	39.8	7.2	47.68	-.68	47.75	-.75	45.45	1.55
44	37	43.6	-6.6	47.4	-10.4	42.4	-5.4	48.18	-11.18	46.25	-9.25	46.55	-9.55
45	38	39.9	-1.9	41.92	-3.92	38	0	42.04	-4.04	46.17	-8.17	42.07	-4.07
46	42	48.3	-6.3	46.06	-4.06	45.4	-3.4	45.66	-3.66	46.33	-4.33	49.63	-7.63
47	44	33.6	10.4	33.56	10.44	35.2	8.8	36.06	7.94	47.08	-3.08	40.18	3.82
48	40	36.3	3.7	36.36	3.64	34.6	5.4	35.49	4.51	47.17	-7.17	39.67	.33
49	47	44.3	2.7	46.45	.55	41.6	5.4	44.98	2.02	46	1	45.5	1.5
50	39	39.3	-.3	40.53	-1.53	39	0	40.74	-1.74	45.92	-6.92	42.82	-3.82
51	62	53.4	8.6	54.86	7.14	48.8	13.2	52.04	9.96	47.33	14.67	54.03	7.97
52	63	56.6	6.4	60.45	2.55	53.8	9.2	59.87	3.13	46.83	16.17	58.53	4.47
53	52	46.9	5.1	53.28	-1.28	43.6	8.4	52.86	-.86	46.08	5.92	47.58	4.42
54	50	45.2	4.8	51.47	-1.47	43	7	52.32	-2.32	46.75	3.25	47.65	2.35
55	36	40	-4	44.97	-8.97	39.8	-3.8	47.06	-11.06	45.83	-9.83	43.53	-7.53
56	44	43.6	.4	46.72	-2.72	42.4	1.6	47.51	-3.51	46.42	-2.42	46.72	-2.72
57	44	39.9	4.1	42.77	1.23	38	6	42.88	1.12	46.92	-2.92	42.82	1.18
58	58	48.3	9.7	51.61	6.39	45.4	12.6	51.21	6.79	48.25	9.75	51.55	6.45
59	27	33.6	-6.6	34.71	-7.71	35.2	-8.2	37.22	-10.22	46.83	-19.83	39.93	-12.93
60	37	36.3	.7	36.91	.09	34.6	2.4	36.04	.96	46.58	-9.58	39.08	-2.08
61		44.3		44.54		41.6		42.49		46.58		46.08	
62		39.3		39.17		39		39.33		46.58		43.48	
63		53.4		52.9		48.8		48.58		46.58		53.28	
64		56.6		55.73		53.8		53.03		46.58		58.28	
65		46.9		45.66		43.6		42.28		46.58		48.08	
66		45.2		43.6		43		41.12		46.58		47.48	

Table 64
Fitted and Forecasted Values from 6 Models for INSCOM Total

MACOM: INSCOM

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	6	3.1	2.9	3.08	2.92	3.8	2.2	3.72	2.28	4.75	1.25	5.3	.7
2	3	4.1	-1.1	4.41	-1.41	4.2	-1.2	4.41	-1.41	4.75	-1.75	5.7	-2.7
3	3	2.1	.9	2.74	.26	2.4	.6	2.9	.1	4.75	-1.75	3.9	-.9
4	2	2	0	2.97	-.97	2	0	2.78	-.78	4.75	-2.75	3.5	-1.5
5	2	4.1	-2.1	5.4	-3.4	3.2	-1.2	4.27	-2.27	4.75	-2.75	4.7	-2.7
6	7	4.5	2.5	6.13	.87	4.6	2.4	5.96	1.04	4.75	2.25	6.1	.9
7	4	1.9	2.1	3.87	.13	2.2	1.8	3.84	.16	4.75	-.75	3.7	.3
8	6	2.5	3.5	4.8	1.2	3.2	2.8	5.13	.87	4.75	1.25	4.7	1.3
9	7	4.7	2.3	7.33	-.33	5.2	1.8	7.42	-.42	4.75	2.25	6.7	.3
10	5	2	3	4.96	.04	2.6	2.4	5.1	-.1	4.75	.25	4.1	.9
11	7	2.3	4.7	5.59	1.41	3	4	5.79	1.21	4.75	2.25	4.5	2.5
12	5	2.1	2.9	5.72	-.72	2.6	2.4	5.68	-.68	4.75	.25	4.1	.9
13	7	3.1	3.9	7.53	-.53	3.8	3.2	7.49	-.49	4.83	2.17	5.38	1.62
14	6	4.1	1.9	8.03	-2.03	4.2	1.8	7.49	-1.49	5.08	.92	6.03	-.03
15	4	2.1	1.9	5.76	-1.76	2.4	1.6	5.42	-1.42	5.17	-1.17	4.32	-.32
16	2	2	0	4.64	-2.64	2	0	4.14	-2.14	5.17	-3.17	3.92	-1.92
17	3	4.1	-1.1	5.04	-2.04	3.2	-.2	4.19	-1.19	5.25	-2.25	5.2	-2.2
18	2	4.5	-2.5	4.06	-2.06	4.6	-2.6	4.3	-2.3	4.83	-2.83	6.18	-4.18
19	3	1.9	1.1	1.26	1.74	2.2	.8	1.71	1.29	4.75	-1.75	3.7	-.7
20	1	2.5	-1.5	1.17	-.17	3.2	-2.2	1.83	-.83	4.33	-3.33	4.28	-3.28
21	4	4.7	-.7	2.91	1.09	5.2	-1.2	3.28	.72	4.08	-.08	6.03	-2.03
22	3	2	1	.48	2.52	2.6	.4	.81	2.19	3.92	-.92	3.27	-.27
23	2	2.3	-.3	1.03	.97	3	-1	1.28	.72	3.5	-1.5	3.25	-1.25
24	4	2.1	1.9	1.62	2.38	2.6	1.4	1.57	2.43	3.42	.58	2.77	1.23
25	1	3.1	-2.1	2.44	-1.44	3.8	-2.8	2.41	-1.41	2.92	-1.92	3.47	-2.47
26	4	4.1	-.1	3.74	.26	4.2	-.2	3.2	.8	2.75	1.25	3.7	.3
27	1	2.1	-1.1	1.82	-.82	2.4	-1.4	1.48	-.48	2.5	-1.5	1.65	-.65
28	3	2	1	2.23	.77	2	1	1.73	1.27	2.58	.42	1.33	1.67
29	2	4.1	-2.1	3.69	-1.69	3.2	-1.2	2.85	-.85	2.5	-.5	2.45	-.45
30	4	4.5	-.5	3.74	.26	4.6	-.6	3.98	.02	2.67	1.33	4.02	-.02
31	0	1.9	-1.9	.89	-.89	2.2	-2.2	1.34	-1.34	2.42	-2.42	1.37	-1.37
32	3	2.5	.5	1.63	1.37	3.2	-.2	2.29	.71	2.58	.42	2.53	.47
33	4	4.7	-.7	3.68	.32	5.2	-1.2	4.05	-.05	2.58	1.42	4.53	-.53
34	3	2	1	1.61	1.39	2.6	.4	1.94	1.06	2.58	.42	1.93	1.07
35	2	2.3	-.3	1.94	.06	3	-1	2.19	-.19	2.58	-.58	2.33	-.33
36	1	2.1	-1.1	1.9	-.9	2.6	-1.6	1.86	-.86	2.33	-1.33	1.68	-.68
37	2	3.1	-1.1	2.51	-.51	3.8	-1.8	2.48	-.48	2.42	-.42	2.97	-.97
38	4	4.1	-.1	3.71	.29	4.2	-.2	3.17	.83	2.42	1.58	3.37	.63
39	2	2.1	-.1	1.75	.25	2.4	-.4	1.41	.59	2.5	-.5	1.65	.35
40	1	2	-1	1.73	-.73	2	-1	1.23	-.23	2.33	-1.33	1.08	-.08
41	2	4.1	-2.1	3.14	-1.14	3.2	-1.2	2.29	-.29	2.33	-.33	2.28	-.28
42	6	4.5	1.5	4.18	1.82	4.6	1.4	4.43	1.57	2.5	3.5	3.85	2.15
43	2	1.9	.1	1.51	.49	2.2	-.2	1.95	.05	2.67	-.67	1.62	.38
44	6	2.5	3.5	3.35	2.65	3.2	2.8	4.01	1.99	2.92	3.08	2.87	3.13
45	8	4.7	3.3	6.42	1.58	5.2	2.8	6.79	1.21	3.25	4.75	5.2	2.8
46	1	2	-1	3.46	-2.46	2.6	-1.6	3.79	-2.79	3.08	-2.08	2.43	-1.43
47	3	2.3	.7	3.85	-.85	3	0	4.1	-1.1	3.17	-.17	2.92	.08
48	1	2.1	-1.1	3.04	-2.04	2.6	-1.6	3	-2	3.17	-2.17	2.52	-1.52
49	3	3.1	-.1	3.73	-.73	3.8	-.8	3.7	-.7	3.25	-.25	3.8	-.8
50	4	4.1	-.1	4.55	-.55	4.2	-.2	4.01	-.01	3.25	.75	4.2	-.2
51	2	2.1	-.1	2.36	-.36	2.4	-.4	2.02	-.02	3.25	-1.25	2.4	-.4
52	2	2	0	1.96	.04	2	0	1.46	.54	3.33	-1.33	2.08	-.08
53	7	4.1	2.9	4.38	2.62	3.2	3.8	3.54	3.46	3.75	3.25	3.7	3.3
54	4	4.5	-.5	4.52	-.52	4.6	-.6	4.76	-.76	3.58	.42	4.93	-.93
55	2	1.9	.1	1.67	.33	2.2	-.2	2.12	-.12	3.58	-1.58	2.53	-.53
56	0	2.5	-2.5	1.83	-1.83	3.2	-3.2	2.49	-2.49	3.08	-3.08	3.03	-3.03
57	3	4.7	-1.7	4.01	-1.01	5.2	-2.2	4.38	-1.38	2.67	.33	4.62	-1.62
58	1	2	-1	.98	.02	2.6	-1.6	1.31	-.31	2.67	-1.67	2.02	-1.02
59	1	2.3	-1.3	1.15	-.15	3	-2	1.39	-.39	2.5	-1.5	2.25	-1.25
60	2	2.1	-.1	.94	1.06	2.6	-.6	.89	1.11	2.58	-.58	1.93	.07
61		3.1		1.8		3.8		1.91		2.58		3.13	
62		4.1		2.65		4.2		2.12		2.58		3.53	
63		2.1		.51		2.4		.13		2.58		1.73	
64		2		.26		2		0		2.58		1.33	
65		4.1		2.22		3.2		.55		2.58		2.53	
66		4.5		2.48		4.6		1.76		2.58		3.93	

Table 65
Fitted and Forecasted Values from 6 Models for BMD Total

MACOM: BMD

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	9	3	6	6.8	2.2	4.4	4.6	7.32	1.68	4.67	4.33	5.22	3.78
2	6	3.5	2.5	6.88	-.88	4.4	1.6	6.94	-.94	4.67	1.33	5.22	.78
3	4	2.4	1.6	5.37	-1.37	2.4	1.6	4.56	-.56	4.67	-.67	3.22	.78
4	3	4.5	-1.5	7.05	-4.05	4.6	-1.6	6.37	-3.37	4.67	-1.67	5.42	-2.42
5	7	4.2	2.8	6.33	.67	5.4	1.6	6.79	.21	4.67	2.33	6.22	.78
6	9	4.1	4.9	5.81	3.19	5.2	3.8	6.21	2.79	4.67	4.33	6.02	2.98
7	4	3.1	.9	4.39	-.39	3.8	.2	4.43	-.43	4.67	-.67	4.62	-.62
8	6	2.7	3.3	3.57	2.43	3.6	2.4	3.84	2.16	4.67	1.33	4.42	1.58
9	3	2.2	.8	2.65	.35	2.8	.2	2.66	.34	4.67	-1.67	3.62	-.62
10	3	3.7	-.7	3.73	-.73	4.2	-1.2	3.68	-.68	4.67	-1.67	5.02	-2.02
11	0	2.2	-2.2	1.82	-1.82	2.4	-2.4	1.5	-1.5	4.67	-4.67	3.22	-3.22
12	2	2.4	-.4	1.6	.4	3	-1	1.71	.29	4.67	-2.67	3.82	-1.82
13	5	3	2	3.09	1.91	4.4	.6	3.68	1.32	4.33	.67	4.88	.12
14	5	3.5	1.5	3.91	1.09	4.4	.6	3.9	1.1	4.25	.75	4.8	.2
15	0	2.4	-2.4	1.87	-1.87	2.4	-2.4	1.27	-1.27	3.92	-3.92	2.47	-2.47
16	2	4.5	-2.5	2.64	-.64	4.6	-2.6	2.41	-.41	3.83	-1.83	4.58	-2.58
17	5	4.2	.8	2.73	2.27	5.4	-.4	3.37	1.63	3.67	1.33	5.22	-.22
18	2	4.1	-2.1	2.6	-.6	5.2	-3.2	2.94	-.94	3.08	-1.08	4.43	-2.43
19	3	3.1	-.1	1.76	1.24	3.8	-.8	1.69	1.31	3	0	2.95	.05
20	3	2.7	.3	2.08	.92	3.6	-.6	2.11	.89	2.75	.25	2.5	.5
21	3	2.2	.8	2.14	.86	2.8	.2	1.91	1.09	2.75	.25	1.7	1.3
22	4	3.7	.3	3.8	.2	4.2	-.2	3.56	.44	2.83	1.17	3.18	.82
23	2	2.2	-.2	2.03	-.03	2.4	-.4	1.71	.29	3	-1	1.55	.45
24	4	2.4	1.6	2.71	1.29	3	1	2.83	1.17	3.17	.83	2.32	1.68
25	3	3	0	3.64	-.64	4.4	-1.4	4.23	-1.23	3	0	3.55	-.55
26	5	3.5	1.5	4.91	.09	4.4	.6	4.9	.1	3	2	3.55	1.45
27	4	2.4	1.6	3.96	.04	2.4	1.6	3.36	.64	3.33	.67	1.88	2.12
28	9	4.5	4.5	6.9	2.1	4.6	4.4	6.67	2.33	3.92	5.08	4.67	4.33
29	9	4.2	4.8	7.8	1.2	5.4	3.6	8.43	.57	4.25	4.75	5.8	3.2
30	12	4.1	7.9	9.18	2.82	5.2	6.8	9.52	2.48	5.08	6.92	6.43	5.57
31	6	3.1	2.9	8.13	-2.13	3.8	2.2	8.06	-2.06	5.33	.67	5.28	.72
32	3	2.7	.3	6.87	-3.87	3.6	-.6	6.9	-3.9	5.33	-2.33	5.08	-2.08
33	5	2.2	2.8	6.33	-1.33	2.8	2.2	6.1	-1.1	5.5	-.5	4.45	.55
34	2	3.7	-1.7	6.3	-4.3	4.2	-2.2	6.06	-4.06	5.33	-3.33	5.68	-3.68
35	7	2.2	4.8	5.18	1.82	2.4	4.6	4.86	2.14	5.75	1.25	4.3	2.7
36	5	2.4	2.6	5.22	-.22	3	2	5.34	-.34	5.83	-.83	4.98	.02
37	5	3	2	5.18	-.18	4.4	.6	5.77	-.77	6	-1	6.55	-1.55
38	5	3.5	1.5	5.07	-.07	4.4	.6	5.05	-.05	6	-1	6.55	-1.55
39	2	2.4	-.4	2.81	-.81	2.4	-.4	2.21	-.21	5.83	-3.83	4.38	-2.38
40	7	4.5	2.5	5.17	1.83	4.6	2.4	4.94	2.06	5.67	1.33	6.42	.58
41	6	4.2	1.8	5.04	.96	5.4	.6	5.67	.33	5.42	.58	6.97	-.97
42	3	4.1	-1.1	4.9	-1.9	5.2	-2.2	5.24	-2.24	4.67	-1.67	6.02	-3.02
43	6	3.1	2.9	4.54	1.46	3.8	2.2	4.47	1.53	4.67	1.33	4.62	1.38
44	6	2.7	3.3	4.47	1.53	3.6	2.4	4.51	1.49	4.92	1.08	4.67	1.33
45	3	2.2	.8	3.87	-.87	2.8	.2	3.64	-.64	4.75	-1.75	3.7	-.7
46	11	3.7	7.3	6.51	4.49	4.2	6.8	6.26	4.74	5.5	5.5	5.85	5.15
47	3	2.2	.8	4.97	-1.97	2.4	.6	4.64	-1.64	5.17	-2.17	3.72	-.72
48	4	2.4	1.6	5.15	-1.15	3	1	5.26	-1.26	5.08	-1.08	4.23	-.23
49	0	3	-3	4.31	-4.31	4.4	-4.4	4.9	-4.9	4.67	-4.67	5.22	-5.22
50	1	3.5	-2.5	3.63	-2.63	4.4	-3.4	3.62	-2.62	4.33	-3.33	4.88	-3.88
51	2	2.4	-.4	1.81	.19	2.4	-.4	1.21	.79	4.33	-2.33	2.88	-.88
52	2	4.5	-2.5	3.05	-1.05	4.6	-2.6	2.82	-.82	3.92	-1.92	4.67	-2.67
53	0	4.2	-4.2	1.47	-1.47	5.4	-5.4	2.1	-2.1	3.42	-3.42	4.97	-4.97
54	0	4.1	-4.1	0	.14	5.2	-5.2	.2	-.2	3.17	-3.17	4.52	-4.52
55	0	3.1	-3.1	0	1.57	3.8	-3.8	0	1.64	2.67	-2.67	2.62	-2.62
56	0	2.7	-2.7	0	1.99	3.6	-3.6	0	1.96	2.17	-2.17	1.92	-1.92
57	0	2.2	-2.2	0	2.54	2.8	-2.8	0	2.77	1.92	-1.92	.87	-.87
58	1	3.7	-2.7	0	1.04	4.2	-3.2	0	1.29	1.08	-.08	1.43	-.43
59	0	2.2	-2.2	0	1.1	2.4	-2.4	0	1.42	.83	-.83	0	.62
60	0	2.4	-2.4	0	.26	3	-3	0	.15	.5	-.5	0	.35
61		3		.34		4.4		1.29		.5		1.05	
62		3.5		.84		4.4		1.33		.5		1.05	
63		2.4		0		2.4		0		.5		0	
64		4.5		1.84		4.6		1.6		.5		1.25	
65		4.2		1.54		5.4		2.44		.5		2.05	
66		4.1		1.44		5.2		2.28		.5		1.85	

Table 66
Fitted and Forecasted Values from 6 Models for MTMC Total

MACOM: MTMC

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	2	2.2	-.2	2.07	-.07	2.8	-.8	2.24	-.24	2.75	-.75	3.05	-1.05
2	2	1.7	.3	1.71	.29	2.2	-.2	1.79	.21	2.75	-.75	2.45	-.45
3	1	2.3	-1.3	2.45	-1.45	2.2	-1.2	1.93	-.93	2.75	-1.75	2.45	-1.45
4	3	1.9	- 1.1	2.19	.81	2.4	.6	2.28	.72	2.75	.25	2.65	.35
5	3	2.3	.7	2.73	.27	2.6	.4	2.63	.37	2.75	.25	2.85	.15
6	2	2.1	-.1	2.67	-.67	2.6	-.6	2.78	-.78	2.75	-.75	2.85	-.85
7	3	2.6	.4	3.31	-.31	3	0	3.32	-.32	2.75	.25	3.25	-.25
8	4	1.6	2.4	2.45	1.55	2.2	1.8	2.67	1.33	2.75	1.25	2.45	1.55
9	5	2.6	2.4	3.59	1.41	3	2	3.62	1.38	2.75	2.25	3.25	1.75
10	4	3.3	.7	4.43	-.43	4	0	4.77	-.77	2.75	1.25	4.25	-.25
11	2	2	0	3.27	-1.27	2.2	-.2	3.11	-1.11	2.75	-.75	2.45	-.45
12	2	.7	1.3	2.11	-.11	.8	1.2	1.86	.14	2.75	-.75	1.05	.95
13	4	2.2	1.8	3.81	.19	2.8	1.2	3.97	.03	2.92	1.08	3.22	.78
14	5	1.7	3.3	3.96	1.04	2.2	2.8	3.97	1.03	3.17	1.83	2.87	2.13
15	0	2.3	-2.3	3.18	-3.18	2.2	-2.2	2.81	-2.81	3.08	-3.08	2.78	-2.78
16	4	1.9	2.1	3.13	.87	2.4	1.6	3.31	.69	3.17	.83	3.07	.93
17	2	2.3	-.3	3.07	-1.07	2.6	-.6	3.09	-1.09	3.08	-1.08	3.18	-1.18
18	3	2.1	.9	2.67	.33	2.6	.4	2.84	.16	3.17	-.17	3.27	-.27
19	1	2.6	-1.6	2.27	-1.27	3	-2	2.35	-1.35	3	-2	3.5	-2.5
20	4	1.6	2.4	1.97	2.03	2.2	1.8	2.15	1.85	3	1	2.7	1.3
21	3	2.6	.4	3.08	-.08	3	0	3.05	-.05	2.83	.17	3.33	-.33
22	5	3.3	1.7	4.06	.94	4	1	4.19	.81	2.92	2.08	4.42	.58
23	4	2	2	2.98	1.02	2.2	1.8	2.69	1.31	3.08	.92	2.78	1.22
24	1	.7	.3	1.53	-.53	.8	.2	1.28	-.28	3	-2	1.3	-.3
25	5	2.2	2.8	3.75	1.25	2.8	2.2	3.9	1.1	3.08	1.92	3.38	1.62
26	1	1.7	-.7	3.14	-2.14	2.2	-1.2	3.15	-2.15	2.75	-1.75	2.45	-1.45
27	7	2.3	4.7	4.45	2.55	2.2	4.8	4.08	2.92	3.33	3.67	3.03	3.97
28	4	1.9	2.1	4.45	-.45	2.4	1.6	4.63	-.63	3.33	.67	3.23	.77
29	5	2.3	2.7	5.03	-.03	2.6	2.4	5.06	-.06	3.58	1.42	3.68	1.32
30	6	2.1	3.9	5.45	.55	2.6	3.4	5.63	.37	3.83	2.17	3.93	2.07
31	8	2.6	5.4	6.48	1.52	3	5	6.55	1.45	4.42	3.58	4.92	3.08
32	0	1.6	-1.6	4.34	-4.34	2.2	-2.2	4.52	-4.52	4.08	-4.08	3.78	-3.78
33	3	2.6	.4	4.62	-1.62	3	0	4.59	-1.59	4.08	-1.08	4.58	-1.58
34	7	3.3	3.7	5.78	1.22	4	3	5.91	1.09	4.25	2.75	5.75	1.25
35	2	2	0	3.82	-1.82	2.2	-.2	3.54	-1.54	4.08	-2.08	3.78	-1.78
36	0	.7	-.7	1.46	-1.46	.8	-.8	1.21	-1.21	4	-4	2.3	-2.3
37	3	2.2	.8	2.78	.22	2.8	.2	2.94	.06	3.83	-.83	4.13	-1.13
38	2	1.7	.3	1.46	.54	2.2	-.2	1.47	.53	3.92	-1.92	3.62	-1.62
39	2	2.3	-.3	1.92	.08	2.2	-.2	1.55	.45	3.5	-1.5	3.2	-1.2
40	0	1.9	-1.9	.67	-.67	2.4	-2.4	.85	-.85	3.17	-3.17	3.07	-3.07
41	2	2.3	-.3	.94	1.06	2.6	-.6	.97	1.03	2.92	-.92	3.02	-1.02
42	2	2.1	-.1	.99	1.01	2.6	-.6	1.16	.84	2.58	-.58	2.68	-.68
43	3	2.6	.4	2.29	.71	3	0	2.36	.64	2.17	.83	2.67	.33
44	2	1.6	.4	1.11	.89	2.2	-.2	1.29	.71	2.33	-.33	2.03	-.03
45	2	2.6	-.6	1.9	.1	3	-1	1.87	.13	2.25	-.25	2.75	-.75
46	3	3.3	-.3	3.06	-.06	4	-1	3.19	-.19	1.92	1.08	3.42	-.42
47	1	2	-1	1.55	-.55	2.2	-1.2	1.27	-.27	1.83	-.83	1.53	-.53
48	0	.7	-.7	.06	-.06	.8	-.8	0	.19	1.83	-1.83	.13	-.13
49	0	2.2	-2.2	1.17	-1.17	2.8	-2.8	1.33	-1.33	1.58	-1.58	1.88	-1.88
50	1	1.7	-.7	.76	.24	2.2	-1.2	.76	.24	1.5	-.5	1.2	-.2
51	1	2.3	-1.3	1.2	-.2	2.2	-1.2	.84	.16	1.42	-.42	1.12	-.12
52	1	1.9	-.9	.54	.46	2.4	-1.4	.72	.28	1.5	-.5	1.4	-.4
53	1	2.3	-1.3	.79	.21	2.6	-1.6	.81	.19	1.42	-.42	1.52	-.52
54	0	2.1	-2.1	.27	-.27	2.6	-2.6	.45	-.45	1.25	-1.25	1.35	-1.35
55	0	2.6	-2.6	.47	-.47	3	-3	.54	-.54	1	-1	1.5	-1.5
56	1	1.6	-.6	0	1.13	2.2	-1.2	.04	.96	.92	.08	.62	.38
57	2	2.6	-.6	1.14	.86	3	-1	1.11	.89	.92	1.08	1.42	.58
58	1	3.3	-2.3	1.66	-.66	4	-3	1.79	-.79	.75	.25	2.25	-1.25
59	2	2	0	.82	1.18	2.2	-.2	.54	1.46	.83	1.17	.53	1.47
60	1	.7	.3	.08	.92	.8	.2	0	1.16	.92	.08	0	1.78
61		2.2		1.69		2.8		1.95		.92		1.22	
62		1.7		1.29		2.2		1.46		.92		.62	
63		2.3		2		2.2		1.57		.92		.62	
64		1.9		1.7		2.4		1.89		.92		.82	
65		2.3		2.21		2.6		2.2		.92		1.02	
66		2.1		2.11		2.6		2.31		.92		1.02	

Table 67
Fitted and Forecasted Values from 6 Models for CIDC Total

MACOM: CIDC

CS	OBS. Y	WM	RESID.	WMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	2	.6	1.4	.56	1.44	1	1	.95	1.05	.5	1.5	.9	1.1
2	1	1.5	-.5	1.44	-.44	1	0	.94	.06	.5	.5	.9	.1
3	0	.6	-.6	.53	-.53	.8	-.8	.73	-.73	.5	-.5	.7	-.7
4	0	1.3	-1.3	1.21	-1.21	1.2	-1.2	1.12	-1.12	.5	-.5	1.1	-1.1
5	0	.3	-.3	.19	-.19	.4	-.4	.31	-.31	.5	-.5	.3	-.3
6	1	.5	.5	.38	.62	.4	.6	.3	.7	.5	.5	.3	.7
7	0	.4	-.4	.26	-.26	.2	-.2	.1	-.1	.5	-.5	.1	-.1
8	0	.4	-.4	.24	-.24	.2	-.2	.09	-.09	.5	-.5	.1	-.1
9	2	.9	1.1	.72	1.28	1	1	.88	1.12	.5	1.5	.9	1.1
10	0	.7	-.7	.51	-.51	.6	-.6	.47	-.47	.5	-.5	.5	-.5
11	0	.2	-.2	0	.01	.2	-.2	.06	-.06	.5	-.5	.1	-.1
12	0	.2	-.2	0	.03	.2	-.2	.05	-.05	.5	-.5	.1	-.1
13	2	.6	1.4	1.08	.92	1	1	1.35	.65	.5	1.5	.9	1.1
14	0	1.5	-1.5	1.52	-1.52	1	-1	1.11	-1.11	.42	-.42	.82	-.82
15	2	.6	1.4	1.03	.97	.8	1.2	1.21	.79	.58	1.42	.78	1.22
16	1	1.3	-.3	1.45	-.45	1.2	-.2	1.36	-.36	.67	.33	1.27	-.27
17	1	.3	.7	.59	.41	.4	.6	.64	.36	.75	.25	.55	.45
18	0	.5	-.5	.67	-.67	.4	-.4	.55	-.55	.67	-.67	.47	-.47
19	0	.4	-.4	.37	-.37	.2	-.2	.23	-.23	.67	-.67	.27	-.27
20	0	.4	-.4	.17	-.17	.2	-.2	.11	-.11	.67	-.67	.27	-.27
21	1	.9	.1	.87	.13	1	0	1.04	-.04	.58	.42	.98	.02
22	1	.7	.3	.66	.34	.6	.4	.67	.33	.67	.33	.67	.33
23	0	.2	-.2	.06	-.06	.2	-.2	.14	-.14	.67	-.67	.27	-.27
24	0	.2	-.2	0	.05	.2	-.2	.02	-.02	.67	-.67	.27	-.27
25	0	.6	-.6	.39	-.39	1	-1	.66	-.66	.5	-.5	.9	-.9
26	1	1.5	-.5	.95	.05	1	0	.54	.46	.58	.42	.98	.02
27	1	.6	.4	.43	.57	.8	.2	.61	.39	.5	.5	.7	.3
28	2	1.3	.7	1.35	.65	1.2	.8	1.26	.74	.58	1.42	1.18	.82
29	0	.3	-.3	.4	-.4	.4	-.4	.45	-.45	.5	-.5	.3	-.3
30	0	.5	-.5	.43	-.43	.4	-.4	.31	-.31	.5	-.5	.3	-.3
31	0	.4	-.4	.21	-.21	.2	-.2	.06	-.06	.5	-.5	.1	-.1
32	0	.4	-.4	.08	-.08	.2	-.2	.02	-.02	.5	-.5	.1	-.1
33	0	.9	-.9	.39	-.39	1	-1	.57	-.57	.42	-.42	.82	-.82
34	1	.7	.3	.43	.57	.6	.4	.44	.56	.42	.58	.42	.58
35	1	.2	.8	.24	.76	.2	.8	.32	.68	.5	.5	.1	.9
36	1	.2	.8	.5	.5	.2	.8	.57	.43	.58	.42	.18	.82
37	1	.6	.4	.94	.06	1	0	1.21	-.21	.67	.33	1.07	-.07
38	0	1.5	-1.5	1.3	-1.3	1	-1	.89	-.89	.58	-.58	.98	-.98
39	1	.6	.4	.61	.39	.8	.2	.79	.21	.58	.42	.78	.22
40	2	1.3	.7	1.65	.35	1.2	.8	1.56	.44	.58	1.42	1.18	.82
41	1	.3	.7	.83	.17	.4	.6	.88	.12	.67	.33	.47	.53
42	0	.5	-.5	.79	-.79	.4	-.4	.67	-.67	.67	-.67	.47	-.47
43	0	.4	-.4	.49	-.49	.2	-.2	.34	-.34	.67	-.67	.27	-.27
44	0	.4	-.4	.29	-.29	.2	-.2	.22	-.22	.67	-.67	.27	-.27
45	1	.9	.1	.65	.35	1	0	.82	.18	.75	.25	1.15	-.15
46	0	.7	-.7	.24	-.24	.6	-.6	.24	-.24	.67	-.67	.67	-.67
47	0	.2	-.2	0	.2	.2	-.2	0	.11	.58	-.58	.18	-.18
48	0	.2	-.2	0	.1	.2	-.2	0	.03	.5	-.5	.1	-.1
49	0	.6	-.6	.25	-.25	1	-1	.52	-.52	.42	-.42	.82	-.82
50	3	1.5	1.5	1.44	1.56	1	2	1.03	1.97	.67	2.33	1.07	1.93
51	0	.6	-.6	.42	-.42	.8	-.8	.59	-.59	.58	-.58	.78	-.78
52	1	1.3	-.3	1.17	-.17	1.2	-.2	1.08	-.08	.5	.5	1.1	-.1
53	0	.3	-.3	.26	-.26	.4	-.4	.31	-.31	.42	-.42	.22	-.22
54	1	.5	.5	.62	.38	.4	.6	.5	.5	.5	.5	.3	.7
55	1	.4	.6	.69	.31	.2	.8	.55	.45	.58	.42	.18	.82
56	1	.4	.6	.83	.17	.2	.8	.76	.24	.67	.33	.27	.73
57	1	.9	.1	1.36	-.36	1	0	1.53	-.53	.67	.33	1.07	-.07
58	1	.7	.3	1.11	-.11	.6	.4	1.12	-.12	.75	.25	.75	.25
59	0	.2	-.2	.47	-.47	.2	-.2	.55	-.55	.75	-.75	.35	-.35
60	0	.2	-.2	.32	-.32	.2	-.2	.39	-.39	.75	-.75	.35	-.35
61		.6		.72		1		1.2		.75		1.15	
62		1.5		1.62		1		1.21		.75		1.15	
63		.6		.72		.8		1.02		.75		.95	
64		1.3		1.42		1.2		1.42		.75		1.35	
65		.3		.42		.4		.63		.75		.55	
66		.5		.62		.4		.64		.75		.55	

Table 68
Fitted and Forecasted Values from 6 Models for USARSO Total

MACOM: USARSO

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	13	11.8	1.2	8.15	4.85	11	2	8.88	4.12	9.25	3.75	9.07	3.93
2	3	9	-6	5.5	-2.5	7.6	-4.6	5.52	-2.52	9.25	-6.25	5.67	-2.67
3	4	10	-6	6.65	-2.65	8.2	-4.2	6.15	-2.15	9.25	-5.25	6.27	-2.27
4	8	15.6	-7.6	12.39	-4.39	13.6	-5.6	11.58	-3.58	9.25	-1.25	11.67	-3.67
5	9	12.9	-3.9	9.84	-.84	12	-3	10.82	-1.82	9.25	-.25	10.07	-1.07
6	14	11.5	2.5	8.59	5.41	11.4	2.6	9.45	4.55	9.25	4.75	9.47	4.53
7	3	11.7	-8.7	8.94	-5.94	9.4	-6.4	7.48	-4.48	9.25	-6.25	7.47	-4.47
8	13	12.8	.2	10.19	2.81	12.4	.6	10.52	2.48	9.25	3.75	10.47	2.53
9	20	15.8	4.2	13.34	6.66	15.6	4.4	13.75	6.25	9.25	10.75	13.67	6.33
10	9	9.4	-.4	7.09	1.91	9.2	-.2	7.38	1.62	9.25	-.25	7.27	1.73
11	9	12.5	-3.5	10.34	-1.34	12.6	-3.6	10.82	-1.82	9.25	-.25	10.67	-1.67
12	6	12	-6	9.99	-3.99	11.2	-5.2	9.45	-3.45	9.25	-3.25	9.27	-3.27
13	11	11.8	-.8	11.06	-.06	11	0	10.48	.52	9.08	1.92	8.9	2.1
14	3	9	-6	6.87	-3.87	7.6	-4.6	5.92	-2.92	9.08	-6.08	5.5	-2.5
15	6	10	-4	7.08	-1.08	8.2	-2.2	6.14	-.14	9.25	-3.25	6.27	-.27
16	12	15.6	-3.6	11.66	.34	13.6	-1.6	11.03	.97	9.58	2.42	12	0
17	8	12.9	-4.9	8.02	-.02	12	-4	8.49	-.49	9.5	-1.5	10.32	-2.32
18	9	11.5	-2.5	7.49	1.51	11.4	-2.4	8.39	.61	9.08	-.08	9.3	-.3
19	2	11.7	-9.7	4.76	-2.76	9.4	-7.4	4.11	-2.11	9	-7	7.22	-5.22
20	5	12.8	-7.8	5.02	-.02	12.4	-7.4	6.04	-1.04	8.33	-3.33	9.55	-4.55
21	4	15.8	-11.8	6.97	-2.97	15.6	-11.6	7.87	-3.87	7	-3	11.42	-7.42
22	3	9.4	-6.4	.96	2.04	9.2	-6.2	1.54	1.46	6.5	-3.5	4.52	-1.52
23	8	12.5	-4.5	4.73	3.27	12.6	-4.6	5.14	2.86	6.42	1.58	7.83	.17
24	8	12	-4	4.67	3.33	11.2	-3.2	4.13	3.87	6.58	1.42	6.6	1.4
25	3	11.8	-8.8	4.28	-1.28	11	-8	3.69	-.69	5.92	-2.92	5.73	-2.73
26	11	9	2	3.91	7.09	7.6	3.4	2.96	8.04	6.58	4.42	3	8
27	3	10	-7	4.72	-1.72	8.2	-5.2	3.78	-.78	6.33	-3.33	3.35	-.35
28	14	15.6	-1.6	11.9	2.1	13.6	.4	11.27	2.73	6.5	7.5	8.92	5.08
29	12	12.9	-.9	10.7	1.3	12	0	11.17	.83	6.83	5.17	7.65	4.35
30	12	11.5	.5	11.45	.55	11.4	.6	12.35	-.35	7.08	4.92	7.3	4.7
31	13	11.7	1.3	12.72	.28	9.4	3.6	12.07	.93	8	5	6.22	6.78
32	18	12.8	5.2	15.94	2.06	12.4	5.6	16.96	1.04	9.08	8.92	10.3	7.7
33	16	15.8	.2	18.42	-2.42	15.6	.4	19.32	-3.32	10.08	5.92	14.5	1.5
34	10	9.4	.6	12.05	-2.05	9.2	.8	12.63	-2.63	10.67	-.67	8.68	1.32
35	20	12.5	7.5	17.27	2.73	12.6	7.4	17.68	2.32	11.67	8.33	13.08	6.92
36	16	12	4	17.47	-1.47	11.2	4.8	16.94	-.94	12.33	3.67	12.35	3.65
37	12	11.8	.2	15.75	-3.75	11	1	15.17	-3.17	13.08	-1.08	12.9	-.9
38	11	9	2	13.41	-2.41	7.6	3.4	12.46	-1.46	13.08	-2.08	9.5	1.5
39	14	10	4	13.96	.04	8.2	5.8	13.03	.97	14	0	11.02	2.98
40	14	15.6	-1.6	17.94	-3.94	13.6	.4	17.31	-3.31	14	0	16.42	-2.42
41	18	12.9	5.1	15.71	2.29	12	6	16.18	1.82	14.5	3.5	15.32	2.68
42	10	11.5	-1.5	12.83	-2.83	11.4	-1.4	13.74	-3.74	14.33	-4.33	14.55	-4.55
43	15	11.7	3.3	13.19	1.81	9.4	5.6	12.54	2.46	14.5	.5	12.72	2.28
44	15	12.8	2.2	14.69	.31	12.4	2.6	15.71	-.71	14.25	.75	15.47	-.47
45	25	15.8	9.2	19.43	5.57	15.6	9.4	20.33	4.67	15	10	19.42	5.58
46	17	9.4	7.6	14.03	2.97	9.2	7.8	14.6	2.4	15.58	1.42	13.6	3.4
47	18	12.5	5.5	18.38	-.38	12.6	5.4	18.79	-.79	15.42	2.58	16.83	1.17
48	15	12	3	17.9	-2.9	11.2	3.8	17.36	-2.36	15.33	-.33	15.35	-.35
49	16	11.8	4.2	17.47	-1.47	11	5	16.89	-.89	15.67	.33	15.48	.52
50	10	9	1	13.64	-3.64	7.6	2.4	12.69	-2.69	15.58	-5.58	12	-2
51	14	10	4	14.87	-.87	8.2	5.8	13.94	.06	15.58	-1.58	12.6	1.4
52	20	15.6	4.4	19.89	.11	13.6	6.4	19.26	.74	16.08	3.92	18.5	1.5
53	13	12.9	.1	16.22	-3.22	12	1	16.69	-3.69	15.67	-2.67	16.48	-3.48
54	12	11.5	.5	13.07	-1.07	11.4	.6	13.97	-1.97	15.83	-3.83	16.05	-4.05
55	14	11.7	2.3	12.76	1.24	9.4	4.6	12.11	1.89	15.75	-1.75	13.97	.03
56	11	12.8	-1.8	12.01	-1.01	12.4	-1.4	13.03	-2.03	15.42	-4.42	16.63	-5.63
57	13	15.8	-2.8	14.18	-1.18	15.6	-2.6	15.07	-2.07	14.42	-1.42	18.83	-5.83
58	7	9.4	-2.4	7.26	-.26	9.2	-2.2	7.83	-.83	13.58	-6.58	11.6	-4.6
59	8	12.5	-4.5	9.26	-1.26	12.6	-4.6	9.67	-1.67	12.75	-4.75	14.17	-6.17
60	11	12	-1	8.65	2.35	11.2	-.2	8.12	2.88	12.42	-1.42	12.43	-1.43
61		11.8		7.78		11		7.13		12.42		12.23	
62		9		4.31		7.6		2.95		12.42		8.83	
63		10		4.64		8.2		2.76		12.42		9.43	
64		15.6		9.58		13.6		7.38		12.42		14.83	
65		12.9		6.21		12		4.99		12.42		13.23	
66		11.5		4.14		11.4		3.61		12.42		12.63	

Table 69
Fitted and Forecasted Values from 6 Models for WESTCOM Total

MACOM: WESTCOM

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	15	19.8	-4.8	18.83	-3.83	18.6	-3.6	17.92	-2.92	13.33	1.67	14.92	.08
2	14	18.8	-4.8	17.17	-3.17	17.2	-3.2	15.97	-1.97	13.33	.67	13.52	.48
3	16	12.7	3.3	10.42	5.58	14	2	12.23	3.77	13.33	2.67	10.32	5.68
4	11	17.4	-6.4	14.46	-3.46	15.4	-4.4	13.08	-2.08	13.33	-2.33	11.72	-.72
5	13	10.9	2.1	7.3	5.7	12	1	9.14	3.86	13.33	-.33	8.32	4.68
6	14	20.3	-6.3	16.05	-2.05	19.2	-5.2	15.79	-1.79	13.33	.67	15.52	-1.52
7	17	18.3	-1.3	13.39	3.61	18	-1	14.04	2.96	13.33	3.67	14.32	2.68
8	15	19	-4	13.43	1.57	18	-3	13.5	1.5	13.33	1.67	14.32	.68
9	17	22.4	-5.4	16.17	.83	21.2	-4.2	16.15	.85	13.33	3.67	17.52	-.52
10	16	20.8	-4.8	13.92	2.08	20.4	-4.4	14.81	1.19	13.33	2.67	16.72	-.72
11	3	17.8	-14.8	10.26	-7.26	16.6	-13.6	10.46	-7.46	13.33	-10.33	12.92	-9.92
12	9	16.8	-7.8	8.6	.4	13.6	-4.6	6.91	2.09	13.33	-4.33	9.92	-.92
13	9	19.8	-10.8	9.73	-.73	18.6	-9.6	10.18	-1.18	12.83	-3.83	14.42	-5.42
14	14	18.8	-4.8	8.86	5.14	17.2	-3.2	9.24	4.76	12.83	1.17	13.02	.98
15	13	12.7	.3	5.75	7.25	14	-1	8.01	4.99	12.58	.42	9.57	3.43
16	7	17.4	-10.4	8.78	-1.78	15.4	-8.4	8.24	-1.24	12.25	-5.25	10.63	-3.63
17	10	10.9	-.9	4.98	5.02	12	-2	6.62	3.38	12	-2	6.98	3.02
18	11	20.3	-9.3	13.31	-2.31	19.2	-8.2	12.85	-1.85	11.75	-.75	13.93	-2.93
19	12	18.3	-6.3	12.09	-.09	18	-6	12.14	-.14	11.33	.67	12.32	-.32
20	13	19	-6	13.39	-.39	18	-5	12.79	.21	11.17	1.83	12.15	.85
21	15	22.4	-7.4	16.82	-1.82	21.2	-6.2	16.16	-1.16	11	4	15.18	-.18
22	20	20.8	-.8	17.38	2.62	20.4	-.4	17.29	2.71	11.33	8.67	14.72	5.28
23	17	17.8	-.8	14.71	2.29	16.6	.4	13.96	3.04	12.5	4.5	12.08	4.92
24	7	16.8	-9.8	12.02	-5.02	13.6	-6.6	10.34	-3.34	12.33	-5.33	8.92	-1.92
25	25	19.8	5.2	17.33	7.67	18.6	6.4	17.78	7.22	13.67	11.33	15.25	9.75
26	24	18.8	5.2	19.03	4.97	17.2	6.8	19.4	4.6	14.5	9.5	14.68	9.32
27	14	12.7	1.3	14.94	-.94	14	0	17.2	-3.2	14.58	-.58	11.57	2.43
28	13	17.4	-4.4	18.15	-5.15	15.4	-2.4	17.61	-4.61	15.08	-2.08	13.47	-.47
29	18	10.9	7.1	14.9	3.1	12	6	16.54	1.46	15.75	2.25	10.73	7.27
30	26	20.3	5.7	25.43	.57	19.2	6.8	24.96	1.04	17	9	19.18	6.82
31	16	18.3	-2.3	22.12	-6.12	18	-2	22.18	-6.18	17.33	-1.33	18.32	-2.32
32	22	19	3	22.98	-.98	18	4	22.38	-.38	18.08	3.92	19.07	2.93
33	25	22.4	2.6	25.83	-.83	21.2	3.8	25.18	-.18	18.92	6.08	23.1	1.9
34	27	20.8	6.2	25.47	1.53	20.4	6.6	25.38	1.62	19.5	7.5	22.88	4.12
35	22	17.8	4.2	22.84	-.84	16.6	5.4	22.09	-.09	19.92	2.08	19.5	2.5
36	15	16.8	-1.8	18.76	-3.76	13.6	1.4	17.07	-2.07	20.58	-5.58	17.17	-2.17
37	26	19.8	6.2	23.22	2.78	18.6	7.4	23.67	2.33	20.67	5.33	22.25	3.75
38	12	18.8	-6.8	19.81	-7.81	17.2	-5.2	20.18	-8.18	19.67	-7.67	19.85	-7.85
39	19	12.7	6.3	14.98	4.02	14	5	17.24	1.76	20.08	-1.08	17.07	1.93
40	27	17.4	9.6	20.78	6.22	15.4	11.6	20.24	6.76	21.25	5.75	19.63	7.37
41	13	10.9	2.1	14.54	-1.54	12	1	16.18	-3.18	20.83	-7.83	15.82	-2.82
42	27	20.3	6.7	25.52	1.48	19.2	7.8	25.05	1.95	20.92	6.08	23.1	3.9
43	29	18.3	10.7	24.91	4.09	18	11	24.96	4.04	22	7	22.98	6.02
44	21	19	2	24.81	-3.81	18	3	24.22	-3.22	21.92	-.92	22.9	-1.9
45	27	22.4	4.6	28.16	-1.16	21.2	5.8	27.5	-.5	22.08	4.92	26.27	.73
46	19	20.8	-1.8	25.13	-6.13	20.4	-1.4	25.05	-6.05	21.42	-2.42	24.8	-5.8
47	25	17.8	7.2	23.34	1.66	16.6	8.4	22.59	2.41	21.67	3.33	21.25	3.75
48	13	16.8	-3.8	19.19	-6.19	13.6	-.6	17.5	-4.5	21.5	-8.5	18.08	-5.08
49	18	19.8	-1.8	21.04	-3.04	18.6	-.6	21.49	-3.49	20.83	-2.83	22.42	-4.42
50	22	18.8	3.2	18.5	3.5	17.2	4.8	18.88	3.12	21.67	.33	21.85	.15
51	8	12.7	-4.7	10.34	-2.34	14	-6	12.59	-4.59	20.75	-12.75	17.73	-9.73
52	19	17.4	1.6	15.8	3.2	15.4	3.6	15.27	3.73	20.08	-1.08	18.47	.53
53	6	10.9	-4.9	7.21	-1.21	12	-6	8.85	-2.85	19.5	-13.5	14.48	-8.48
54	18	20.3	-2.3	16.31	1.69	19.2	-1.2	15.85	2.15	18.75	-.75	20.93	-2.93
55	16	18.3	-2.3	15.03	.97	18	-2	15.09	.91	17.67	-1.67	18.65	-2.65
56	19	19	0	16.18	2.82	18	1	15.59	3.41	17.5	1.5	18.48	.52
57	22	22.4	-.4	20.42	1.58	21.2	.8	19.77	2.23	17.08	4.92	21.27	.73
58	20	20.8	-.8	18.67	1.33	20.4	-.4	18.58	1.42	17.17	2.83	20.55	-.55
59	16	17.8	-1.8	16.69	-.69	16.6	-.6	15.94	.06	16.42	-.42	16	0
60	24	16.8	7.2	17.87	6.13	13.6	10.4	16.18	7.82	17.33	6.67	13.92	10.08
61		19.8		21.17		18.6		21.59		17.33		18.92	
62		18.8		20.47		17.2		20.61		17.33		17.52	
63		12.7		14.67		14		17.82		17.33		14.32	
64		17.4		19.67		15.4		19.63		17.33		15.72	
65		10.9		13.47		12		16.64		17.33		12.32	
66		20.3		23.17		19.2		24.25		17.33		19.52	

Table 70
Fitted and Forecasted Values from 6 Models for MDW Total

MACOM: MDW

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	5	8.8	-3.8	9.37	-4.37	9.2	-4.2	9.15	-4.15	7.25	-2.25	8.57	-3.57
2	3	4.2	-1.2	4.67	-1.67	5.2	-2.2	5.04	-2.04	7.25	-4.25	4.57	-1.57
3	4	4.3	-.3	4.67	-.67	4.8	-.8	4.54	-.54	7.25	-3.25	4.17	-.17
4	14	6.3	7.7	6.57	7.43	7.4	6.6	7.03	6.97	7.25	6.75	6.77	7.23
5	8	8.2	-.2	8.37	-.37	8.6	-.6	8.13	-.13	7.25	.75	7.97	.03
6	9	10.1	-1.1	10.17	-1.17	10.4	-1.4	9.82	-.82	7.25	1.75	9.77	-.77
7	12	8.2	3.8	8.18	3.82	9	3	8.31	3.69	7.25	4.75	8.37	3.63
8	8	8.1	-.1	7.98	.02	8.4	-.4	7.61	.39	7.25	.75	7.77	.23
9	11	9.6	1.4	9.38	1.62	10	1	9.1	1.9	7.25	3.75	9.37	1.63
10	4	5.5	-1.5	5.18	-1.18	7	-3	5.99	-1.99	7.25	-3.25	6.37	-2.37
11	4	5.1	-1.1	4.68	-.68	5.8	-1.8	4.69	-.69	7.25	-3.25	5.17	-1.17
12	5	8.3	-3.3	7.78	-2.78	8.8	-3.8	7.58	-2.58	7.25	-2.25	8.17	-3.17
13	13	8.8	4.2	8.87	4.13	9.2	3.8	8.69	4.31	7.92	5.08	9.23	3.77
14	11	4.2	6.8	5.76	5.24	5.2	5.8	6.02	4.98	8.58	2.42	5.9	5.1
15	5	4.3	.7	5.39	-.39	4.8	.2	5.23	-.23	8.67	-3.67	5.58	-.58
16	5	6.3	-1.3	7.62	-2.62	7.4	-2.4	7.86	-2.86	7.92	-2.92	7.43	-2.43
17	8	8.2	-.2	9.11	-1.11	8.6	-.6	8.76	-.76	7.92	.08	8.63	-.63
18	14	10.1	3.9	11.66	2.34	10.4	3.6	11.38	2.62	8.33	5.67	10.85	3.15
19	10	8.2	1.8	10.41	-.41	9	1	10.56	-.56	8.17	1.83	9.28	.72
20	5	8.1	-3.1	8.95	-3.95	8.4	-3.4	8.76	-3.76	7.92	-2.92	8.43	-3.43
21	5	9.6	-4.6	9.01	-4.01	10	-5	9.04	-4.04	7.42	-2.42	9.53	-4.53
22	13	5.5	7.5	6.78	6.22	7	6	7.53	5.47	8.17	4.83	7.28	5.72
23	5	5.1	-.1	5.73	-.73	5.8	-.8	5.66	-.66	8.25	-3.25	6.17	-1.17
24	10	8.3	1.7	8.41	1.59	8.8	1.2	8.21	1.79	8.67	1.33	9.58	.42
25	6	8.8	-2.8	8.12	-2.12	9.2	-3.2	7.94	-1.94	8.08	-2.08	9.4	-3.4
26	6	4.2	1.8	4.79	1.21	5.2	.8	5.05	.95	7.67	-1.67	4.98	1.02
27	6	4.3	1.7	5.3	.7	4.8	1.2	5.14	.86	7.75	-1.75	4.67	1.33
28	8	6.3	1.7	7.34	.66	7.4	.6	7.57	.43	8	0	7.52	.48
29	13	8.2	4.8	10.27	2.73	8.6	4.4	9.92	3.08	8.42	4.58	9.13	3.87
30	12	10.1	1.9	12.83	-.83	10.4	1.6	12.54	-.54	8.25	3.75	10.77	1.23
31	13	8.2	4.8	12.17	.83	9	4	12.32	.68	8.5	4.5	9.62	3.38
32	15	8.1	6.9	13	2	8.4	6.6	12.82	2.18	9.33	5.67	9.85	5.15
33	17	9.6	7.4	14.94	2.06	10	7	14.98	2.02	10.33	6.67	12.45	4.55
34	9	5.5	3.5	11.69	-2.69	7	2	12.44	-3.44	10	-1	9.12	-.12
35	12	5.1	6.9	12.03	-.03	5.8	6.2	11.95	.05	10.58	1.42	8.5	3.5
36	12	8.3	3.7	15.05	-3.05	8.8	3.2	14.85	-2.85	10.75	1.25	11.67	.33
37	15	8.8	6.2	15.28	-.28	9.2	5.8	15.11	-.11	11.5	3.5	12.82	2.18
38	4	4.2	-.2	8.95	-4.95	5.2	-1.2	9.22	-5.22	11.33	-7.33	8.65	-4.65
39	7	4.3	2.7	8.24	-1.24	4.8	2.2	8.07	-1.07	11.42	-4.42	8.33	-1.33
40	6	6.3	-.3	8.5	-2.5	7.4	-1.4	8.73	-2.73	11.25	-5.25	10.77	-4.77
41	8	8.2	-.2	9.28	-1.28	8.6	-.6	8.93	-.93	10.83	-2.83	11.55	-3.55
42	7	10.1	-3.1	8.92	-1.92	10.4	-3.4	8.63	-1.63	10.42	-3.42	12.93	-5.93
43	3	8.2	-5.2	4.81	-1.81	9	-6	4.96	-1.96	9.58	-6.58	10.7	-7.7
44	9	8.1	.9	5.04	3.96	8.4	.6	4.85	4.15	9.08	-.08	9.6	-.6
45	11	9.6	1.4	7.33	3.67	10	1	7.36	3.64	8.58	2.42	10.7	.3
46	8	5.5	2.5	3.92	4.08	7	1	4.67	3.33	8.5	-.5	7.62	.38
47	7	5.1	1.9	4.64	2.36	5.8	1.2	4.57	2.43	8.08	-1.08	6	1
48	12	8.3	3.7	9.15	2.85	8.8	3.2	8.95	3.05	8.08	3.92	9	3
49	7	8.8	-1.8	9.76	-2.76	9.2	-2.2	9.58	-2.58	7.42	-.42	8.73	-1.73
50	2	4.2	-2.2	4.39	-2.39	5.2	-3.2	4.65	-2.65	7.25	-5.25	4.57	-2.57
51	2	4.3	-2.3	4.25	-2.25	4.8	-2.8	4.08	-2.08	6.83	-4.83	3.75	-1.75
52	4	6.3	-2.3	5.7	-1.7	7.4	-3.4	5.93	-1.93	6.67	-2.67	6.18	-2.18
53	6	8.2	-2.2	7.18	-1.18	8.6	-2.6	6.83	-.83	6.5	-.5	7.22	-1.22
54	10	10.1	-.1	8.87	1.13	10.4	-.4	8.58	1.42	6.75	3.25	9.27	.73
55	7	8.2	-1.2	5.96	1.04	9	-2	6.12	.88	7.08	-.08	8.2	-1.2
56	5	8.1	-3.1	5.17	-.17	8.4	-3.4	4.98	.02	6.75	-1.75	7.27	-2.27
57	6	9.6	-3.6	6.06	-.06	10	-4	6.09	-.09	6.33	-.33	8.45	-2.45
58	1	5.5	-4.5	1.46	-.46	7	-6	2.21	-1.21	5.75	-4.75	4.87	-3.87
59	1	5.1	-4.1	.85	.15	5.8	-4.8	.77	.23	5.25	-4.25	3.17	-2.17
60	5	8.3	-3.3	4.6	.4	8.8	-3.8	4.4	.6	4.67	.33	5.58	-.58
61		8.8		4.89		9.2		4.59		4.67		5.98	
62		4.2		.09		5.2		.37		4.67		1.98	
63		4.3		0		4.8		0		4.67		1.58	
64		6.3		1.77		7.4		2.14		4.67		4.18	
65		8.2		3.46		8.6		3.13		4.67		5.38	
66		10.1		5.16		10.4		4.71		4.67		7.18	

Table 71
Fitted and Forecasted Values from 6 Models for USACE Total

MACOM: USACE

CS	OBS. Y	WM	RESID.	WMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	8	18.5	-10.5	15.81	-7.81	18.4	-10.4	15.38	-7.38	18.08	-10.08	18.93	-10.93
2	13	17.3	-4.3	15.44	-2.44	18	-5	15.63	-2.63	18.08	-5.08	18.53	-5.53
3	15	12	3	10.98	4.02	13	2	11.27	3.73	18.08	-3.08	13.53	1.47
4	20	14.8	5.2	14.61	5.39	16	4	14.92	5.08	18.08	1.92	16.53	3.47
5	19	16.4	2.6	17.04	1.96	16.4	2.6	15.96	3.04	18.08	.92	16.93	2.07
6	15	14.6	.4	16.07	-1.07	15.4	-.4	15.61	-.61	18.08	-3.08	15.93	-.93
7	28	16.2	11.8	18.5	9.5	19.2	8.8	20.06	7.94	18.08	9.92	19.73	8.27
8	15	16.7	-1.7	19.83	-4.83	18	-3	19.5	-4.5	18.08	-3.08	18.53	-3.53
9	21	18.6	2.4	22.56	-1.56	21.2	-.2	23.35	-2.35	18.08	2.92	21.73	-.73
10	24	18.6	5.4	23.39	.61	20.8	3.2	23.59	.41	18.08	5.92	21.33	2.67
11	19	14.4	4.6	20.02	-1.02	15.4	3.6	18.84	.16	18.08	.92	15.93	3.07
12	20	16.3	3.7	22.75	-2.75	18.8	1.2	22.89	-2.89	18.08	1.92	19.33	.67
13	23	18.5	4.5	23.66	-.66	18.4	4.6	21.86	1.14	19.33	3.67	20.18	2.82
14	20	17.3	2.7	21.09	-1.09	18	2	20.4	-.4	19.92	.08	20.37	-.37
15	15	12	3	15.46	-.46	13	2	15.23	-.23	19.92	-4.92	15.37	-.37
16	20	14.8	5.2	18.95	1.05	16	4	18.98	1.02	19.92	.08	18.37	1.63
17	13	16.4	-3.4	18.26	-5.26	16.4	-3.4	17.72	-4.72	19.42	-6.42	18.27	-5.27
18	21	14.6	6.4	16.93	4.07	15.4	5.6	17.44	3.56	19.92	1.08	17.77	3.23
19	24	16.2	7.8	21.08	2.92	19.2	4.8	23.03	.97	19.58	4.42	21.23	2.77
20	22	16.7	5.3	21.3	.7	18	4	21.57	.43	20.17	1.83	20.62	1.38
21	31	18.6	12.4	25.43	5.57	21.2	9.8	26.42	4.58	21	10	24.65	6.35
22	28	18.6	9.4	26.88	1.12	20.8	7.2	27.09	.91	21.33	6.67	24.58	3.42
23	15	14.4	.6	21.26	-6.26	15.4	-.4	20.42	-5.42	21	-6	18.85	-3.85
24	25	16.3	8.7	24.12	.88	18.8	6.2	24.26	.74	21.42	3.58	22.67	2.33
25	33	18.5	14.5	28.94	4.06	18.4	14.6	27.15	5.85	22.25	10.75	23.1	9.9
26	29	17.3	11.7	28.85	.15	18	11	28.15	.85	23	6	23.45	5.55
27	19	12	7	22.98	-3.98	13	6	22.74	-3.74	23.33	-4.33	18.78	.22
28	21	14.8	6.2	25.18	-4.18	16	5	25.21	-4.21	23.42	-2.42	21.87	-.87
29	18	16.4	1.6	23.35	-5.35	16.4	1.6	22.81	-4.81	23.83	-5.83	22.68	-4.68
30	15	14.6	.4	19.21	-4.21	15.4	-.4	19.73	-4.73	23.33	-8.33	21.18	-6.18
31	13	16.2	-3.2	17.88	-4.88	19.2	-6.2	19.83	-6.83	22.42	-9.42	24.07	-11.07
32	19	16.7	2.3	17.07	1.93	18	1	17.34	1.66	22.17	-3.17	22.62	-3.62
33	20	18.6	1.4	18.7	1.3	21.2	-1.2	19.69	.31	21.25	-1.25	24.9	-4.9
34	16	18.6	-2.6	17.17	-1.17	20.8	-4.8	17.37	-1.37	20.25	-4.25	23.5	-7.5
35	19	14.4	4.6	12.55	6.45	15.4	3.6	11.72	7.29	20.58	-1.58	18.43	.57
36	20	16.3	3.7	14.97	5.03	18.8	1.2	15.11	4.89	20.17	-.17	21.42	-1.42
37	12	18.5	-6.5	15.84	-3.84	18.4	-6.4	14.04	-2.04	18.42	-6.42	19.27	-7.27
38	15	17.3	-2.3	14.89	.11	18	-3	14.19	.81	17.25	-2.25	17.7	-2.7
39	6	12	-6	8.5	-2.5	13	-7	8.27	-2.27	16.17	-10.17	11.62	-5.62
40	5	14.8	-9.8	9.46	-4.46	16	-11	9.49	-4.49	14.83	-9.83	13.28	-8.28
41	16	16.4	-.4	11.84	4.16	16.4	-.4	11.3	4.7	-14.67	1.33	13.52	2.48
42	12	14.6	-2.6	10.05	1.95	15.4	-3.4	10.56	1.44	14.42	-2.42	12.27	-.27
43	20	16.2	3.8	13.06	6.94	19.2	.8	15.01	4.99	15	5	16.65	3.35
44	22	16.7	5.3	16.06	5.94	18	4	16.33	5.67	15.25	6.75	15.7	6.3
45	21	18.6	2.4	19.34	1.66	21.2	-.2	20.33	.67	15.33	5.67	18.98	2.02
46	21	18.6	2.4	20.01	.99	20.8	.2	20.22	.78	15.75	5.25	19	2
47	12	14.4	-2.4	16.08	-4.08	15.4	-3.4	15.24	-3.24	15.17	-3.17	13.02	-1.02
48	19	16.3	2.7	19.87	-.87	18.8	.2	20	-1	15.08	3.92	16.33	2.67
49	16	18.5	-2.5	20.76	-4.76	18.4	-2.4	18.97	-2.97	15.42	.58	16.27	-.27
50	13	17.3	-4.3	18.27	-5.27	18	-5	17.58	-4.58	15.25	-2.25	15.7	-2.7
51	10	12	-2	11.82	-1.82	13	-3	11.59	-1.59	15.58	-5.58	11.03	-1.03
52	14	14.8	-.8	13.04	.96	16	-2	13.07	.93	16.33	-2.33	14.78	-.78
53	16	16.4	-.4	14.39	1.61	16.4	-.4	13.85	2.15	16.33	-.33	15.18	.82
54	14	14.6	-.6	11.92	2.08	15.4	-1.4	12.43	1.57	16.5	-2.5	14.35	-.35
55	11	16.2	-5.2	12.48	-1.48	19.2	-8.2	14.43	-3.43	15.75	-4.75	17.4	-6.4
56	12	16.7	-4.7	12.69	-.69	18	-6	12.96	-.96	14.92	-2.92	15.37	-3.37
57	13	18.6	-5.6	13.93	-.93	21.2	-8.2	14.92	-1.92	14.25	-1.25	17.9	-4.9
58	15	18.6	-3.6	14.17	.83	20.8	-5.8	14.37	.63	13.75	1.25	17	-2
59	12	14.4	-2.4	9.99	2.01	15.4	-3.4	9.15	2.85	13.75	-1.75	11.6	.4
60	10	16.3	-6.3	11.61	-1.61	18.8	-8.8	11.75	-1.75	13	-3	14.25	-4.25
61		18.5		13.54		18.4		10.89		13		13.85	
62		17.3		12.07		18		10.04		13		13.45	
63		12		6.5		13		4.58		13		8.45	
64		14.8		9.03		16		7.13		13		11.45	
65		16.4		10.36		16.4		7.07		13		11.85	
66		14.6		8.29		15.4		5.61		13		10.85	

Table 72
Fitted and Forecasted Values from 6 Models for ARMYWIDE Total

MACOM: ARMYWIDE

CS	OBS. Y	WM	RESID.	WMMALT	RESID.	SM	RESID.	SMMALT	RESID.	SMPL MA	RESID.	SMSMA	RESID.
1	1203	1190.8	12.2	1216.66	-13.66	1203.4	-.4	1213.26	-10.26	1316	-113	1225.45	-22.45
2	1019	1013.2	5.8	1042.59	-23.59	1026.6	-7.6	1038.68	-19.68	1316	-297	1048.65	-29.65
3	914	910.4	3.6	943.32	-29.32	926.2	-12.2	940.49	-26.49	1316	-402	948.25	-34.25
4	1339	1344.9	-5.9	1381.34	-42.34	1343	-4	1359.51	-20.51	1316	23	1365.05	-26.05
5	1190	1139.1	50.9	1179.07	10.93	1167.2	22.8	1185.93	4.07	1316	-126	1189.25	.75
6	1446	1295.7	150.3	1339.2	106.8	1332.8	113.2	1353.74	92.26	1316	130	1354.85	91.15
7	1310	1240.4	69.6	1287.42	22.58	1262.2	47.8	1285.36	24.64	1316	-6	1284.25	25.75
8	1582	1479.2	102.8	1529.75	52.25	1537.4	44.6	1562.77	19.23	1316	266	1559.45	22.55
9	1668	1601.5	66.5	1655.57	12.43	1636.2	31.8	1663.79	4.21	1316	352	1658.25	9.75
10	1531	1455.4	75.6	1513	18	1491.2	39.8	1521.01	9.99	1316	215	1513.25	17.75
11	1296	1358.6	-62.6	1419.73	-123.73	1366.6	-70.6	1398.62	-102.62	1316	-20	1388.65	-92.65
12	1294	1219.7	74.3	1284.35	9.65	1234.6	59.4	1268.84	25.16	1316	-22	1256.65	37.35
13	1245	1190.8	54.2	1252.58	-7.58	1203.4	41.6	1239.66	5.34	1319.5	-74.5	1228.95	16.05
14	1069	1013.2	55.8	1069.9	-.9	1026.6	42.4	1062.31	6.69	1323.67	-254.67	1056.32	12.68
15	956	910.4	45.6	956.72	-.72	926.2	29.8	954.94	1.06	1327.17	-371.17	959.42	-3.42
16	1258	1344.9	-86.9	1338.57	-80.57	1343	-85	1330.68	-72.68	1320.42	-62.42	1369.47	-111.47
17	1171	1139.1	31.9	1127.73	43.27	1167.2	3.8	1147.59	23.41	1318.83	-147.83	1192.08	-21.08
18	1355	1295.7	59.3	1304.67	50.33	1332.8	22.2	1327.12	27.88	1311.25	43.75	1350.1	4.9
19	1202	1240.4	-38.4	1230.95	-28.95	1262.2	-60.2	1238.75	-36.75	1302.25	-100.25	1270.5	-68.5
20	1570	1479.2	90.8	1499.11	70.89	1537.4	32.6	1527.16	42.84	1301.25	268.75	1544.7	25.3
21	1665	1601.5	63.5	1637.14	27.86	1636.2	28.8	1636.38	28.62	1301	364	1643.25	21.75
22	1567	1455.4	111.6	1522.58	44.42	1491.2	75.8	1517.12	49.88	1304	263	1501.25	65.75
23	1416	1358.6	57.4	1416.93	-.93	1366.6	49.4	1390.68	25.32	1314	102	1386.65	29.35
24	1253	1219.7	33.3	1280.26	-27.26	1234.6	18.4	1264.75	-11.75	1310.58	-57.58	1251.23	1.77
25	1140	1190.8	-50.8	1227.03	-87.03	1203.4	-63.4	1214.11	-74.11	1301.83	-161.83	1211.28	-71.28
26	1029	1013.2	15.8	1049.04	-20.04	1026.6	2.4	1041.45	-12.45	1298.5	-269.5	1031.15	-2.15
27	998	910.4	87.6	966.86	31.14	926.2	71.8	965.08	32.92	1302	-304	934.25	63.75
28	1257	1344.9	-87.9	1346.53	-89.53	1343	-86	1338.64	-81.64	1301.92	-44.92	1350.97	-93.97
29	1180	1139.1	40.9	1143.72	36.28	1167.2	12.8	1163.57	16.43	1302.67	-122.67	1175.92	4.08
30	1255	1295.7	-40.7	1283.46	-28.46	1332.8	-77.8	1305.91	-50.91	1294.33	-39.33	1333.18	-78.18
31	1287	1240.4	46.6	1224.62	62.38	1262.2	24.8	1232.41	54.59	1301.42	-14.42	1269.67	17.33
32	1645	1479.2	165.8	1513.28	131.72	1537.4	107.6	1541.33	103.67	1307.67	337.33	1551.12	93.88
33	1668	1601.5	66.5	1648.73	19.27	1636.2	31.8	1647.97	20.03	1307.92	360.08	1650.17	17.83
34	1471	1455.4	15.6	1508.67	-37.67	1491.2	-20.2	1503.21	-32.21	1299.92	171.08	1497.17	-26.17
35	1410	1358.6	51.4	1423.13	-13.13	1366.6	43.4	1396.88	13.12	1299.42	110.58	1372.07	37.93
36	1256	1219.7	36.3	1287.25	-31.25	1234.6	21.4	1271.74	-15.74	1299.67	-43.67	1240.32	15.68
37	1268	1190.8	77.2	1259.3	8.7	1203.4	64.6	1246.38	21.62	1310.33	-42.33	1219.78	48.22
38	1039	1013.2	25.8	1073.67	-34.67	1026.6	12.4	1066.07	-27.07	1311.17	-272.17	1043.82	-4.82
39	907	910.4	-3.4	965.81	-58.81	926.2	-19.2	964.03	-57.03	1303.58	-396.58	935.83	-28.83
40	1553	1344.9	208.1	1431.86	121.14	1343	210	1423.98	129.02	1328.25	224.75	1377.3	175.7
41	1255	1139.1	115.9	1240.51	14.49	1167.2	87.8	1260.37	-5.37	1334.5	-79.5	1207.75	47.25
42	1393	1295.7	97.3	1389.59	3.41	1332.8	60.2	1412.04	-19.04	1346	47	1384.85	8.15
43	1365	1240.4	124.6	1344.06	20.94	1262.2	102.8	1351.86	13.14	1352.5	12.5	1320.75	44.25
44	1605	1479.2	125.8	1609.86	-4.86	1537.4	67.6	1637.91	-32.91	1349.17	255.83	1592.62	12.38
45	1687	1601.5	85.5	1732.26	-45.26	1636.2	50.8	1731.5	-44.5	1350.75	336.25	1693	-6
46	1517	1455.4	61.6	1569.99	-52.99	1491.2	25.8	1564.53	-47.53	1354.58	162.42	1551.83	-34.83
47	1395	1358.6	36.4	1453.8	-58.8	1366.6	28.4	1427.55	-32.55	1353.33	41.67	1425.98	-30.98
48	1171	1219.7	-48.7	1268.47	-97.47	1234.6	-63.6	1252.95	-81.95	1346.25	-175.25	1286.9	-115.9
49	1161	1190.8	-29.8	1208.8	-47.8	1203.4	-42.4	1195.88	-34.88	1337.33	-176.33	1246.78	-85.78
50	977	1013.2	-36.2	994.09	-17.09	1026.6	-49.6	986.5	-9.5	1332.17	-355.17	1064.82	-87.82
51	856	910.4	-54.4	846.33	9.67	926.2	-70.2	844.56	11.44	1327.92	-471.92	960.17	-104.17
52	1308	1344.9	-36.9	1278.24	29.76	1343	-35	1270.36	37.64	1307.5	.5	1356.55	-48.55
53	1040	1139.1	-99.1	1045.57	-5.57	1167.2	-127.2	1065.43	-25.43	1289.58	-249.58	1162.83	-122.83
54	1215	1295.7	-80.7	1185.9	29.1	1332.8	-117.8	1208.35	6.65	1274.75	-59.75	1313.6	-98.6
55	1147	1240.4	-93.4	1121.97	25.03	1262.2	-115.2	1129.77	17.23	1256.58	-109.58	1224.83	-77.83
56	1285	1479.2	-194.2	1331.01	-46.01	1537.4	-252.4	1359.06	-74.06	1229.92	55.08	1473.37	-188.37
57	1493	1601.5	-108.5	1454.41	38.59	1636.2	-143.2	1453.65	39.35	1213.75	279.25	1556	-63
58	1370	1455.4	-85.4	1319.7	50.3	1491.2	-121.2	1314.23	55.77	1201.5	168.5	1398.75	-28.75
59	1316	1358.6	-42.6	1248.36	67.64	1366.6	-50.6	1222.11	93.89	1194.92	121.08	1267.57	48.43
60	1199	1219.7	-20.7	1130.24	68.76	1234.6	-35.6	1114.72	84.28	1197.25	1.75	1137.9	61.1
61		1190.8		1098.43		1203.4		1079.31		1197.25		1106.7	
62		1013.2		917.93		1026.6		898.3		1197.25		929.9	
63		910.4		812.23		926.2		793.68		1197.25		829.5	
64		1344.9		1243.82		1343		1206.27		1197.25		1246.3	
65		1139.1		1035.12		1167.2		1026.25		1197.25		1070.5	
66		1295.7		1188.81		1332.8		1187.64		1197.25		1236.1	

V. THE ESTIMATION OF THE DATA WHICH IS UNREPORTED AS OF FORECASTING TIMES

As was pointed out in Section I, there is a lag between the time an accident actually occurs and the time the accident report is received by USASC. Thus, for example, in December FY 1988, USASC has only received a percentage of the reports for accidents which occurred in the previous 11 months of FY 1987 and 1988. If 6-months ahead forecasts are to be made in December FY 1988, then the historic data for the previous 11 months is incomplete. Without further information, the usual methods of forecasting univariate series, which assume complete knowledge of historic data up to the forecasting date, would not be applicable. Fortunately, data concerning the historic reporting patterns of the various army units can be retrieved from the USASC database. From these data an estimate for the percentage of the data which is not yet reported as of the forecasting date can be obtained.

Experience has shown that essentially all accidents have been reported within 12 months after their occurrence. The data which has not yet been reported for the intervening months will be called "unreported data."

In order to obtain data concerning the historic reporting pattern for a given time series, we proceed as follows. Suppose the forecast is to be made in October FY 1989. It is assumed that the actual number of accidents is known for October FY 1983 - October FY 1988. A 1-month lag series for Nov. FY 83 - Oct. FY 1988 can be obtained in the following manner. Compute the percentage of the actual total number of accidents for each month of Nov. FY 83 - Oct. FY 88 which had been reported as of

one month later. For example, these percentages are computed as

$$P(\text{Oct}83) = \frac{\text{number reported for Oct 83 as of Nov 83}}{\text{total number of accidents for Oct 83}}$$

84 85 85 86 87

$$\cdots$$

$$P(\text{Oct}88) = \frac{\text{number reported for Oct 88 as of Nov 88}}{\text{total number of accidents for Oct 88}}$$

feasible but will take programming time by Monroe to do

where all years are fiscal years. The one-month ahead forecast of this series is used as an estimate of the percentage of the total number of accidents for September FY 1988 which have been reported as of October FY 1989.

In a similar manner, we can form a 2-month lag, 3-month lag, . . . 11-month lag series. A one-month ahead forecast for each of these series provide ~~as~~ an estimate of the percentage of the total number of accidents for August FY 1988, July FY 1988, . . . , November FY 1988, respectively.

From a theoretical point of view, the problem can be considered as a multivariate problem in which each of the 11 lagged series must be forecasted before the original series can be forecasted. Thus, from the statistical point of view, the forecasts of the original series are complicated functions of the historical data.

It was hoped that the lagged series would, apart from a non-zero mean, be essentially white noise series with a small variance, or at least have a locally constant mean with locally small variance. Unfortunately, this did not turn out to be true in all cases. In what follows, we discuss the nature of some of the lagged series for representative values of the lags. Recall that these series are percentages, and each series is of length 60.

On Table 73, we present the sample estimates of the mean, variance, and standard deviation for some of the lagged series.

Table 73
The Mean, Variance, and Standard Deviation of
Some Lagged Series

Series	- Lag	Mean (%)	Variance	Standard Deviation
8TH ARMY	9 MO	99.54	2.37	1.54
"	6 MO	98.81	4.93	2.22
"	3 MO	93.45	1.58	1.26
"	1 MO	42.40	463.55	21.53
AMC	9 MO	99.64	1.31	1.14
"	6 MO	98.64	4.86	2.20
"	3 MO	94.72	26.43	5.14
"	1 MO	56.3	457.98	21.4
HQDA	9 MO	99.92	0.19	0.44
"	6 MO	99.55	1.27	1.13
"	3 MO	96.26	13.66	3.7
"	1 MO	56.96	433.56	20.82
USAISC	9 MO	99.92	0.38	0.61
"	6 MO	99.07	6.75	2.6
"	3 MO	90.06	93.6	9.67
"	1 MO	35.54	442.36	21.03
FORSCOM	9 MO	99.41	0.51	.72
"	6 MO	98.14	2.32	1.52
"	3 MO	91.57	16.34	4.04
"	1 MO	53.68	202.50	14.23
USAREUR	9 MO	99.66	0.16	.41
"	6 MO	98.09	2.47	1.57
"	3 MO	89.21	18.51	4.30
"	1 MO	38.14	306.97	17.52
TRADOC	9 MO	99.8	0.14	0.38
"	6 MO	98.91	1.76	1.33
"	3 MO	93.24	9.42	3.07
"	1 MO	51.79	336.11	18.33
ARNG	9 MO	97.81	4.84	2.2
"	6 MO	90.74	76.6	8.75
"	3 MO	71.12	290.14	17.03
"	1 MO	30.17	212.2	14.57

This shows that 6 mos is a good cut off

It can be seen from Table 73 that over the 5-year period, all commands examined except ARNG averaged reporting over 98 percent of their total number of accidents within 6 months after they occurred. The lower figures for ARNG are mainly due to the atypical behavior of the FY 1982 data for this command. More importantly, the standard deviations for the 6-month and 9-month lag series is encouragingly small. As would be expected, when the lags become shorter the mean percentage of data reported decreases. However, the standard deviations increase dramatically. In all cases the series with short lags display larger variance than would be hoped for.

The series listed in Table 73 were examined in much the same manner as the original time series of the total number of accidents (Sections III and IV). It was hoped that the series would either be

(1) white noise, apart from a non-zero mean, or

(2) would have locally constant trend and could thus be fitted by a simple moving average model.

In either of these cases, a one-month ahead forecast could be produced with a minimal amount of retrieval of data from the database. A brief summary of our analyses for selected commands follows. These analyses were made on the percentage series for FY 1982-FY 1986.

FORSCOM - The initial ANOVA and periodogram for the series with 6- and 9- month lags exhibited some indication of trend and seasonality. The raw data failed the WNT. The residuals from a 12-point SIMPL MA model failed the WNT. We experimented with shorter and longer SIMPL MA models. The forecast values for the various models did not differ greatly. The residual series from a 6-point SIMPL MA passed the WNT for the 9-month lag series and barely failed it for the 3-month lag series.

Of course a 6-point simple moving average is considered quite short. There was some evidence of a 5-month cycle in these series.

Strangely, the raw data for the 3-month lag series passed the WNT, and the residual series from a 12-point SIMPL MA model also passed the WNT. The raw data for the 1-month lag series failed the WNT, and the residual series from a 12-point SIMPL MA barely failed the WNT.

USAREUR - The raw data for the 9-month lag series passed the WNT. The raw data for the 6-month lag series barely failed the WNT. In both these series, there was some indication of a cycle other than seasonality. The raw data for the 3-month lag series failed the WNT; furthermore, the residual series from both a 12-point and a 6-point SIMPL MA model failed the WNT. The residual series from a SSMALT (6-point MALT) passed the WNT. The raw data for the 1-month lag series failed the WNT and all attempts to fit it with a simple model failed.

TRADOC - The raw data for the 6- and 9-month lag data failed the WNT with trend and seasonality being indicated in the series. The only simple model which produced a white noise-like residual series was an SMMALT (6-point MALT) model. The raw data for the 1-month lag series failed the WNT. The only model which produced a residual series that passed the WNT was to first remove the effects of a 20-month cycle and then perform a 6-point MALT on the residuals.

ARNG - In all the series for this MACOM, the 1982 data was not typical of the data for the other years. Specifically, the percentages of the total data reported in FY 1982 were much smaller than those reported for the other years. Thus the following analyses were based on FY 1983 - FY 1986.

The raw data for the 1-, 3-, 6-, and 9-month lag series all failed

the WNT. For the 6- and 9-month lag series there is an indication of trend and seasonality in the series. There is an indication of some trend and a high degree of seasonality in the 1- and 3-month lag series. None of the simple models produced a residual series which passed the WNT.

A similar pattern emerged for the series for the other commands which we studied. Our conclusion is that the percentage of data reported for 6-month or longer lags can be estimated quite accurately. The degree of accuracy of the estimation for the shorter lags are likely to be considerably less without some highly sophisticated modeling being performed on the lagged series. Some of the series with short lags appear to be more complicated than their original counterparts. Such modeling is obviously impractical, hence the one-month ahead forecasts will have to be produced by a simple method. In the next section we suggest such a method. This is simply an attempt to improve on the present method of computing the ratio needed for obtaining the estimated number of accidents (Section II).

this means shorter lags yield more variable estimates of unreported data & that for lags of 6 mos or more we can be confident

VI. FURTHER ANALYSES, COMPARISON OF SOME FORECASTS, RECOMMENDATIONS, REPORTING METHODS, AND SOFTWARE

VI-1. WEIGHTS FOR COMPUTING THE MEAN. We have noted that in most cases the ~~WM~~ SM model gives a better fit than does the ~~SM~~ WM model, ~~and~~ but for the series examined, the WM model usually produced better forecasts. Some computational analyses and the following observations may help to explain why this is so.

Let

$$[X_1, X_2, X_3, X_4, X_5] \tag{1}$$

be the actual number of accidents which occur in a given month over a 5-year period, ordered from earliest to most recent. The forecasts for the SM model are produced by a weighted moving average (WMA) with weights

$$[.2, .2, .2, .2, .2] \tag{2}$$

and those for the WM model are produced by a simple moving average with weights

-.1 .05 .2 .35 .5

$$[.1, .1, .2, .2, .4] \quad (3).$$

why did they stick with these weights?

this WM model omits the adjustment factor - however, the WMMSLT model includes a trend adjustment. why compare old model without the adjustment factor to new model with an adjustment factor?

In the method used by USASC prior to adopting the current WM model, the forecasts were produced by passing a regression line through the points of (1). This is equivalent to producing the forecasts by a WMA with weights

$$[-.4, -.1, .2, .5, .8] \quad (4).$$

This will be called the WMR model.

Now the weights of (2) make no provisions for a trend in the observations of (1), while those of (4) are derived explicitly to account for a linear trend. Computations strongly indicate that the weights (3) for the WM model lie somewhere between those of (2) and (4) in the

(2) > best fit for historical data but
(3) > best forecast

not as strong a trend correction as (4)

ability to account for trend. That is, the weights of (3) are much better than those of (2) in detecting trend, but are more conservative than those of (4).

?

(3) will not respond to change as much as (4)

In Tables 74-76, we show the forecasts from the SM, WM, and WMR models for FY 1987 for three MACOMs. These forecasts were based on FY 1982 - FY 1986 data.

As we have seen, the series for FORSCOM total has a fairly weak statistical indication for trend and a WM or SM model should give the best fit and forecasts. From Table 74 we see that the WM model is in general more effective than the SM model in accounting for a slight trend, while in some instances, the WMR model tends to overcorrect for trend.

The series for TRADOC shows a definite trend. From Table 75 we see that the WM model is again more effective than the SM model in accounting for trend, while, in general, the WMR model produces much better forecasts than either of the other models. Most forecasts for this command exceed the actual data. The WMR model appears to be well suited for this command.

vs SM & WM MALT!

not absolutely

The series for ARMYWIDE total also shows a definite trend. From Table 76, we again see that the WM model is more effective than the SM model in detecting this trend, while again, the WMR model produces the best forecasts.

It was found that for the AMC series, which also shows trend, the WMR model did not perform well. This is because the data tends to follow a bow-shaped curve rather than a straight line.

FY87

Table 74
Comparison of Some Forecasts for FORSCOM Total

Actual Data	SM Forecasts	WM Forecasts	WMR Forecasts
414	403	401	389
315	323	318	319
256	312	313	304
378	420	418	420
354	367	353	310
431	426	420	415
395	412	406	398
336	473	455	414
339	444	437	445
364	443	437	437
348	448	441	438
435	439	437	441

Table 75
Comparison of Some Forecasts for TRADOC Total

Actual Data	SM Forecasts	WM Forecasts	WMR Forecasts
101	158	149	126
88	134	132	123
69	95	91	86
119	132	152	131
107	127	137	125
114	134	148	131
116	140	130	108
80	166	157	139
107	169	168	158
102	167	161	145
140	161	155	136
141	143	142	129

Table 76
Comparison of Some Forecasts for ARMYWIDE Total

Actual Data	SM Forecasts	WM Forecasts	WMR Forecasts
1137	1216	1202	1192
1019	1037	1025	1006
831	935	918	882
1123	1303	1304	1291
1133	1208	1212	1241
1130	1319	1296	1277
1094	1275	1205	1223
1134	1551	1449	1380
1200	1651	1577	1544
1272	1499	1430	1390
1124	1381	1342	1377
1175	1250	1210	1160

VI-2. FURTHER COMPARISON OF SOME FORECASTS. Since the complete data for FY 1987 became available in September 1988, we are now in the position to compare some selected forecasts. The forecasts for the first 6 months of FY 1987 are based on data for FY 1982 - FY 1986. The forecasts for the second six months of FY 1987 are based on the data for April FY 1982 - March FY 1987. These are all 6-month ahead forecasts.

In Figure 1, the forecasts from the WM model for FORSCOM total are plotted against the actual data. The WM model produced better forecasts for this series than any other model we considered.

In Figure 2, the forecasts from the WM models and the WMMALT models for TRADOC total are compared. The WMMALT model consistently produces improved forecasts except for the last month of the fiscal year. The number of accidents for September remained approximately constant over FY 1983-1986, while the number of accidents for the other months have shown a marked decrease. This plays a major role in preventing the WMMALT model from further improving the forecasts for the other months.

In Figure 3, the forecasts from the WM and WMMALT models for AMC total are compared. The WMMALT model generally improves the forecasts for this command. The observed value of 19 accidents for March FY 1987 is unusually low. Already 39 accidents have been reported for March 1988.

In Figure 4, the forecasts for ARMYWIDE total from the WM and WMMALT models are compared. The WMMALT generally produces improved forecasts. Note that all forecasts for April - August are too high. In these months the number of accidents reported was much lower than in previous years. Based on historical data, no model could predict this sudden decrease in the number of accidents reported.

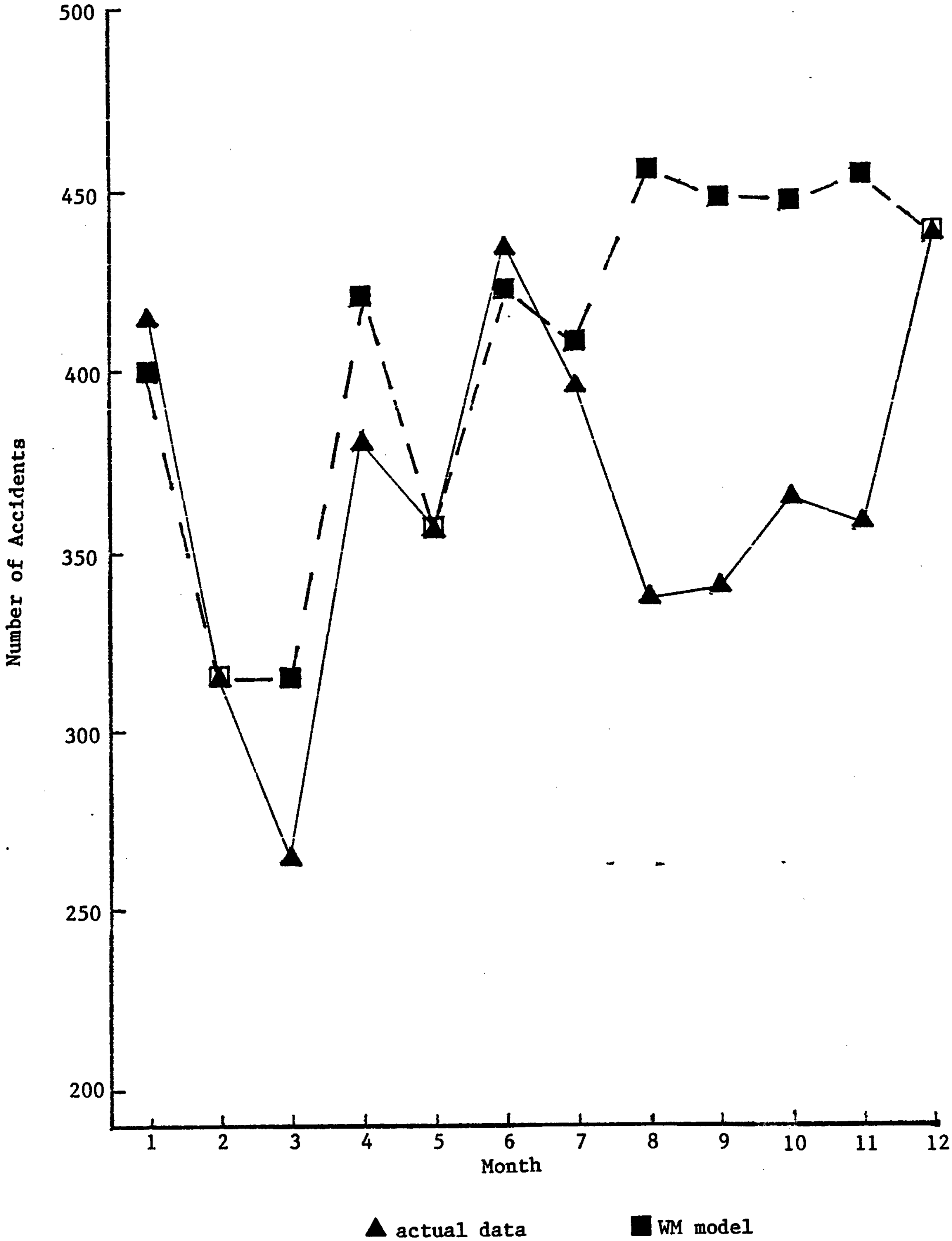

Figure 1. Forecasts for FORSCOM total.

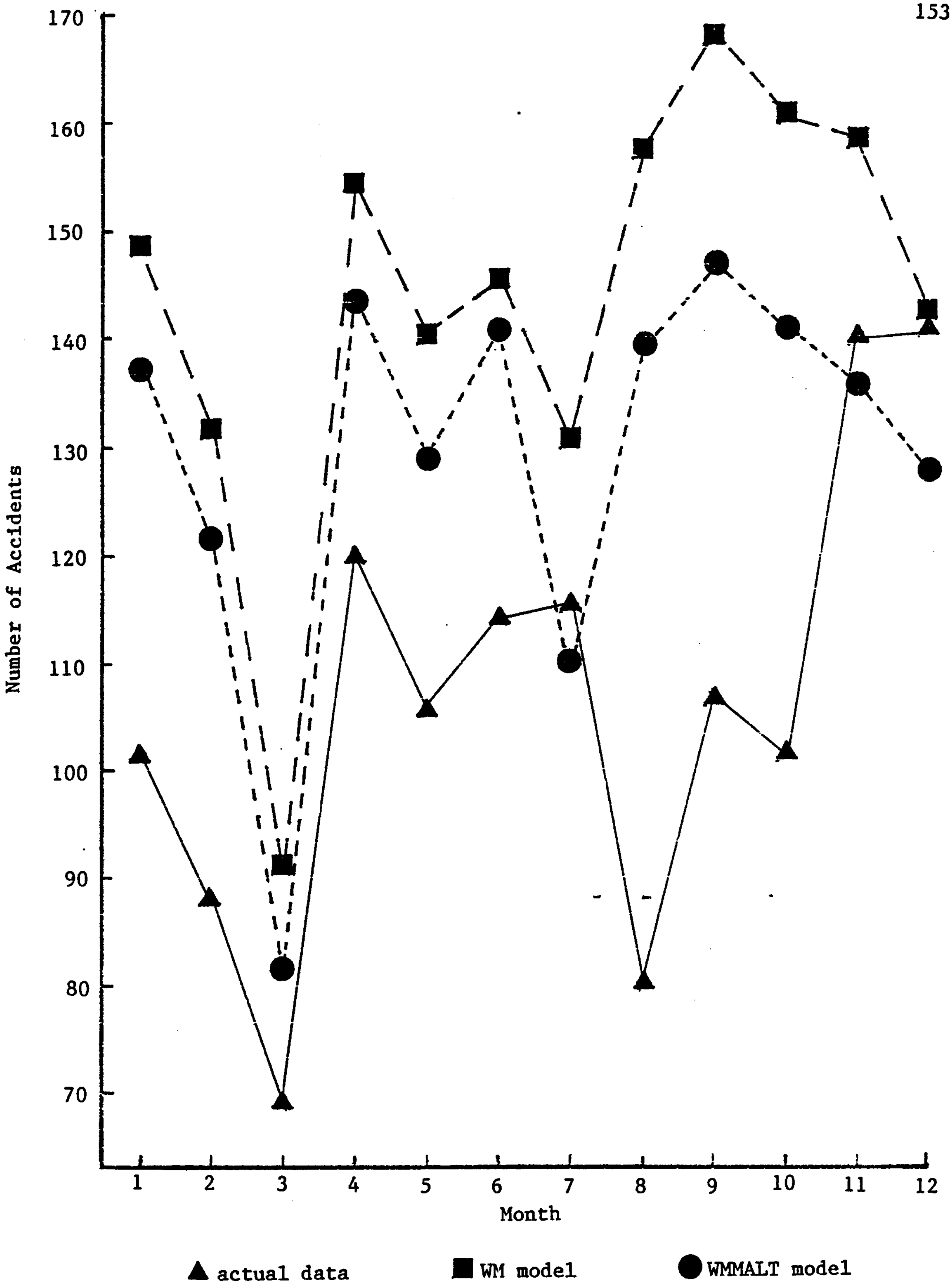

Figure 2. Forecasts for TRADOC total.

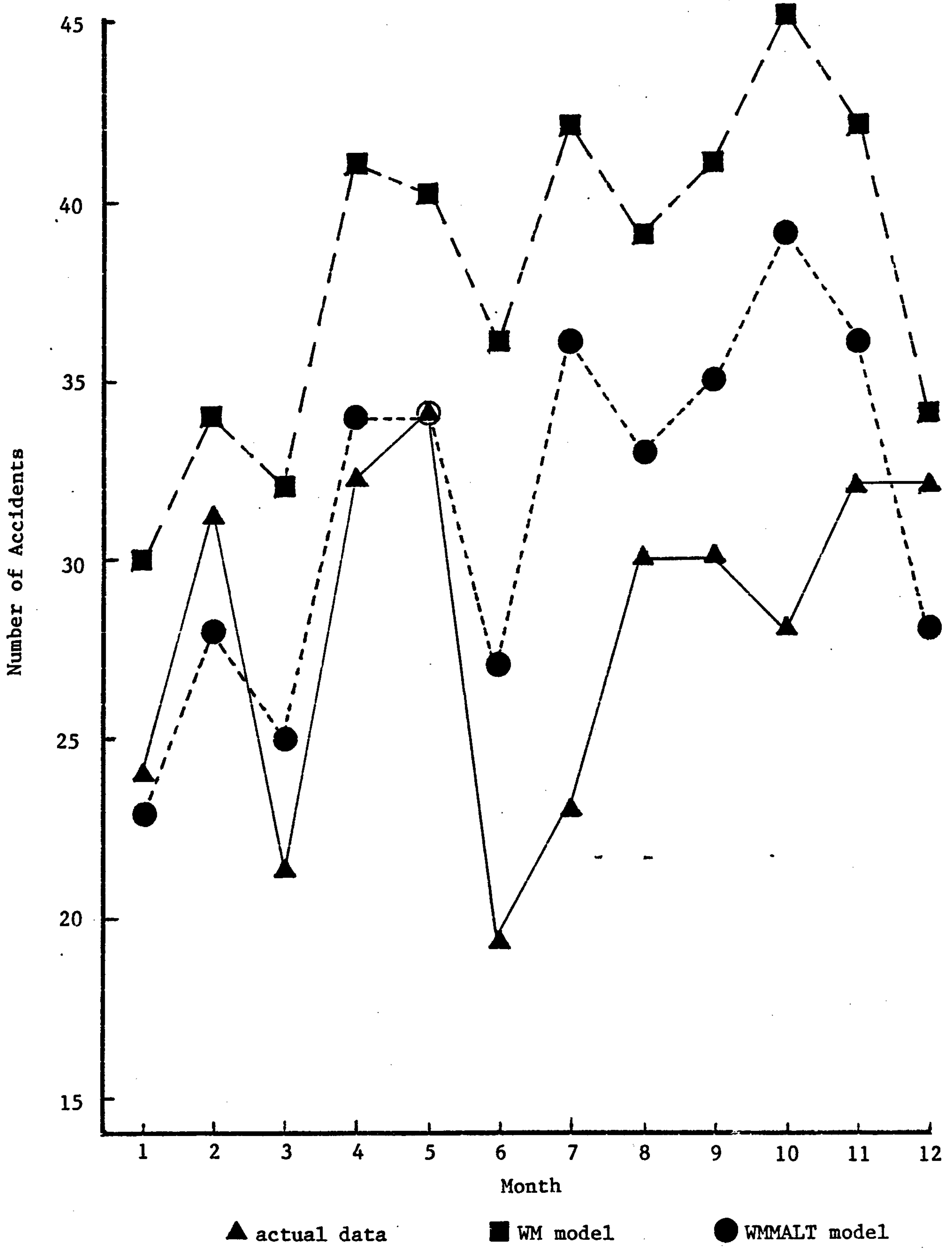

Figure 3. Forecasts for AMC total.

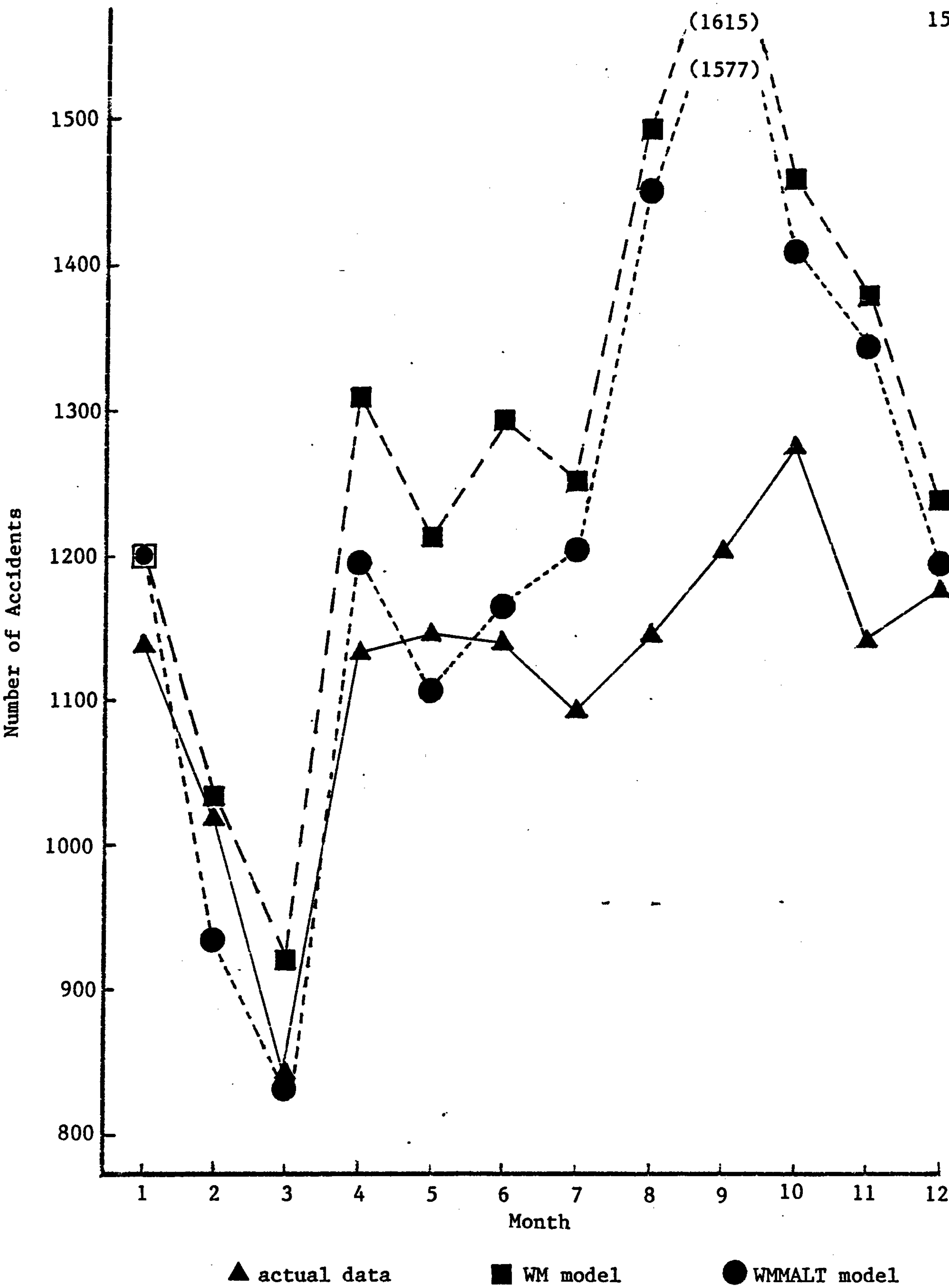

Figure 4. Forecasts for ARMYWIDE total.

As as pointed out in Section IV, the ARNG series gives strong indications of a 10-month cycle in addition to seasonality. Two latent frequencies so close together are generally considered suspect, but there were valid reasons to believe that an additional cycle might exist in this series. Thus a fourier model was fitted which removed a 10- and 12-month cycle. The forecasts for the WM, WMMALT, SM, and fourier models are shown in Table 77. It can be seen that the fourier model overcorrects in many cases. There certainly seems to be no justification for a special model for this MACOM. In Figure 5, we compare the forecasts from the WM and WMMALT models. While the WMMALT model improves the forecasts for some months, there is no clear distinction between models for this MACOM.

Table 77
Comparison of Forecasts for ARNG Total

Actual Data	WM Forecasts	Fourier Forecasts	WMMALT Forecasts	SM Forecasts
84	84	82	64	84
67	80	90	58	77
47	57	81	32	56
79	125	120	97	118
72	108	92	78	102
123	125	111	92	125
126	150	120	143	141
255	285	385	280	303
299	458	486	454	481
279	295	334	292	318
140	217	215	216	217
67	95	98	95	94

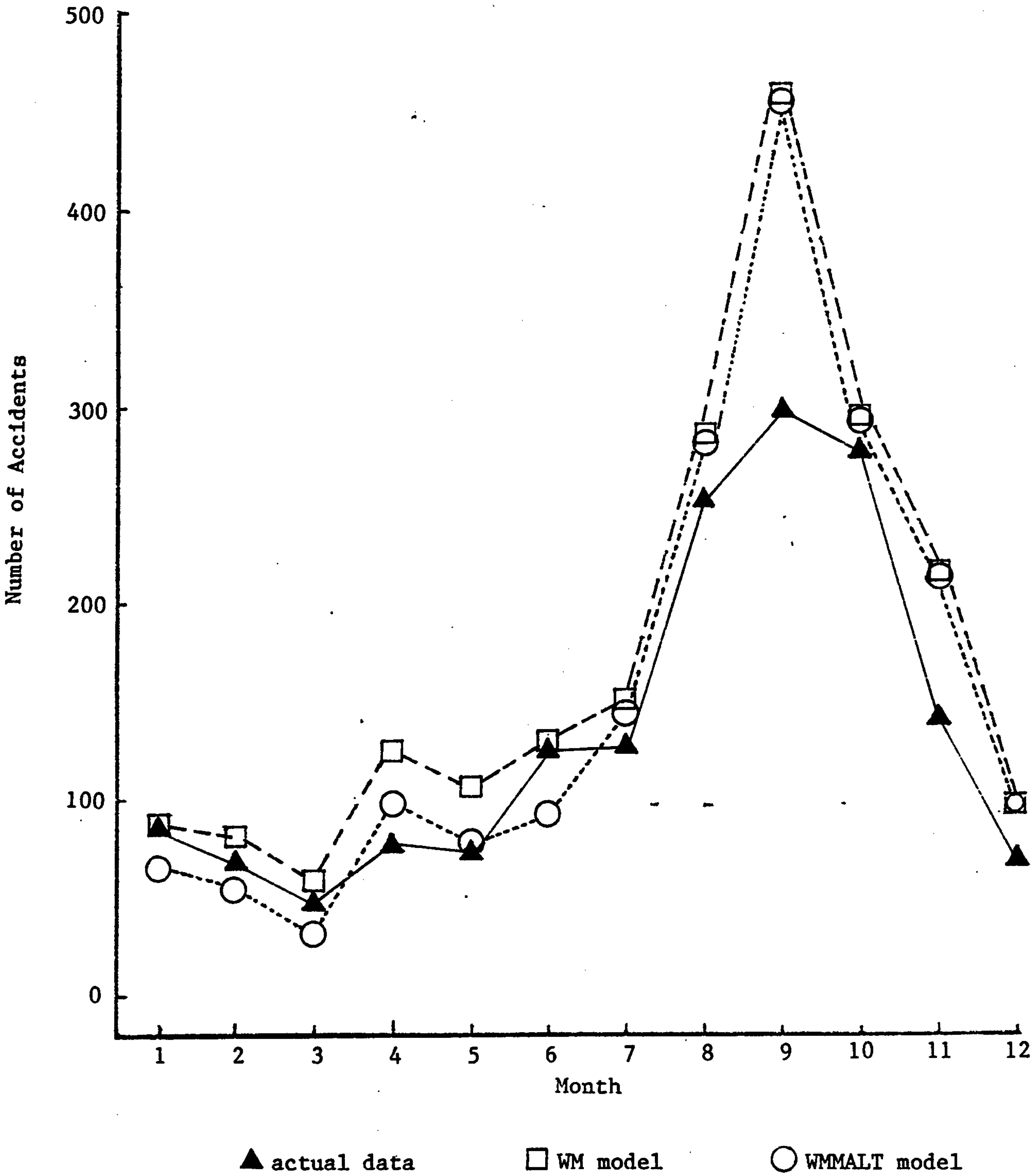

Figure 5. Forecasts for ARNG total.

VI-3. DISCUSSION OF VARIOUS MODELS. The WMMALT model is a heuristic model. In application, it has the effect of producing a trend correction for the forecasts from the WM model.

There is an alternate model for dealing with seasonal data through moving averages processes which is discussed by Kendall (9, pp. 56-62). In this model, the observed data can be seasonally adjusted without trend fitting, and then the trend component of the adjusted series can be estimated by a MALT or other methods. We tested this method and found that for the present series, it did not work as well as the WMMALT model.

The exponential smoothing and Winter's models were ruled out because we could not find a range of values for the parameters of the model which was applicable to most of the series we studied. Automatic parameter optimization will generally not produce good results unless such a range can be found.

The Box-Jenkins method was not deemed to be feasible because of the problems of model identification and parameter estimation. Furthermore, many authors believe that many more than 60 observation are needed for the application of the Box-Jenkins method, especially for seasonal series.

VI-4. OUTLIERS. In many of the series we considered, there were a few observations that were grossly atypical of the other data. Such atypical data points will tend to distort almost any analysis. It is recommended that USASC continue to replace the very worst outliers or atypical observations before forecasting the series.

VI-5. ESTIMATING THE PERCENTAGE OF UNREPORTED DATA. The use of the lagged percentage series in estimating the proportion of data unreported on the forecasting data was discussed in Section V.

Currently the estimate of the percentage of unreported data is estimated from the last term of this series. From general statistical experience it would seem that in general, better results would be obtained if more terms of the series were used. Since it is not feasible to forecast these series, the only practical approach seems to be to compute the last 12 terms in each of the 11 lagged series, and use the mean of these 12 terms as the estimate of the percentage of unreported data for the month to which the lagged series corresponds.

VI-6. REPORTING METHODS. We have examined the reporting methods used by USASC in detail and feel that the present reports are attractive, informative, and easy to follow. The only change that we suggest is that the estimated total number of accidents for a given month be computed using the method of the last section.

VI-7. MODELS FOR THE MACOMS. In choosing a model for a MACOM, the WM model is recommended unless the WMMALT model produces significantly better prediction. The reason for this is because the forecasts from the WM model can be produced without relying on the estimated totals for the 6 months immediately preceding the forecast month. As we observed in Section V, we expect to be able to produce reliable estimates of the eventual totals for the 6th - 11th month preceding the forecasting date. The suggested models for the various MACOMs are as follows:

estimates of late reports

WM MODEL

FORSCOM	JAPAN	USAREUR	HQDA
ARNG	CIDC	USAISC	

WMMALT MODEL

TRADOC	MTMC	AMC	WESTCOM
HSC	MDW	8TH ARMY	USACE
INSCOM	USARSO	BMD	ARMYWIDE

no estimate for missing data

when missing data must be estimated

It should be noted that when the trend is linear, the WMR model (the method previously used by USASC) might perform better in practice than the WMMALT model (for the commands indicated as WMMALT MACOMs). The WMMALT may perform better on actual data,? but any advantage may be offset by the fact that forecasts from the WMMALT depend on the estimated totals from the 6 months immediately preceding the forecast month, while those from the WMR model do not. Unfortunately, the WMR model is not effective in handling certain types of trend. i.e. non linear?

VI-8. THE FORECASTING ADJUSTMENT FACTOR. The forecasting adjustment factor was discussed in Section II. It was used to reconcile the weighted mean of the month forecasts and the estimated final totals for the 6 months preceding the forecast date. It may also be regarded as a correction for trend in the forecasts. Such a correction is clearly needed since so many of the series for the MACOMs show some trend. In the WMMALT model, the trend corrections for the forecasts are computed by a regression method. Explicitly, they are computed by estimating the trend of the observation for a given month away from the 5-year mean of that month. Unfortunately, like the forecast adjustment factor, they depend on the estimated totals for the 11 months preceding the forecasts. As we have seen, we can expect the estimated totals for 5 of these months to be accurate, while we would like to avoid using the estimates for the other 6 months. However, it seems inevitable that, in many cases, we must use these estimates. In any event, there is no need to apply the adjustment factor to WMMALT forecasts since they are already corrected for linear trend.

The forecast adjustment factor should also not be applied to the forecasts from the WM model for the MACOMs for which the WM model is the

suggested model (Section VI-7). For these MACOMs, there is considerable indication that the observations for one 6-month period are independent of those in the previous 6-month period, and so applying the adjustment factor would not be useful. Also, one advantage of the WM model is that its forecasts do not depend on the estimated totals for the 6 months preceding the forecasting data.

It should be noted that the corrections for the forecasts as applied by the WMMALT model are obtained from an additive linear model. While the adjustment factor is computed as recommended in Section II, the forecast corrections are obtained from a type of mixed constant model.

There is an alternative method of automatic model selection which is much more preferable if it can be implemented. Before selection of the model, perform a randomized block ANOVA on the 60 observations using year and month as the independent variables. If trend is significant at a predetermined significance level, choose the WMMALT model; otherwise, choose the WM model.

why not pick from all 6 on p119 instead of 2 of the 6?

because these 2 are the best for all MACOMs

VI-9. SOFTWARE. The USASC currently has the SAS system which is highly regarded because of its versatility, ease of use, and theoretical soundness. This package has a superb compiler and its graphics package is of great use in the automated production of statistical tables and charts.

The WM and WMMALT models are not specifically implemented in any statistical package. The WM model is already implemented at USASC in the form described in Section II. In Appendix II, we give the necessary details for implementing the WMMALT model. Its implementation is quite easy to achieve.

All major statistical packages have provisions for performing a

randomized block ANOVA. We will provide USASC personnel with an algorithm for writing such a program, and we will include a sample program. It may be deemed easier to write a program for this simple ANOVA than to try to interface with the SAS ANOVA procedure.

VI-10. CONCLUSION. Because of the practical difficulties in estimating the percentage of unreported data in the ~~6~~ 5 months immediately preceding the forecasting date, and other limitations discussed in Section I, it is our conclusion that the best course is to choose models which are conservative and easy to apply. Both the WM and WMMALT models fit this description. We do not believe that it will be difficult to implement automatic model selection of these models according to the degree of the trend exhibited by the series.

we still have to estimate unreported data all during the year we are forecasting

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APPENDIX I

SPECTRAL FORMULAS; THE PERIODOGRAM AND THE WHITE NOISE TEST

A. THEORETICAL DEVELOPMENT

Consider a time series

$$\{X(t):t \in T\} \tag{1}$$

where T is a set of real numbers which is closed under addition, and each random variable X(t) has a finite second moment. Let.

$$\mu(t) = E(X(t)),$$

$$\sigma^2(t) = E(X(t) - \mu(t))^2$$

be the mean and Variance of X(t). Also, let

$$r(s,t) = E(\, X(s) - \mu(s)\,)\,(\, X(t) - \mu(t)\,),\ \ (s,t) \in T \times T, \tag{2}$$

denote the covariance function between X(s) and X(t).

The Correlation function $\rho(s,t)$ is defined by

$$\rho(s,t) = r(s,t)/\sigma(t)\sigma(s), \tag{3}$$

where we assume $\sigma(t) > 0$, $\sigma(s) > 0$.

It is well known that $\rho(s,t)$ satisfies the inequality $-1 \le \rho(s,t) \le 1$.

We say that the series (1) is <u>weakly stationary</u> if for each $t \in T$, the set of pairs

$$\{(X(s), X(s+t)), s \in T\}$$

are identically distributed and the random variables of (1) are identically distributed with common mean μ and common Variance σ^2. We can then define the antocovariance function

$$r(t) = r(s,s+t),\ t \in T \tag{4}$$

and the autocorrelation function

$$\rho(t) = r(t)/\sigma^2 \tag{5}$$

Note that r(t) is independent of $s \in T$, and if s, t, $(s-t) \in T$, then by setting u = s - t we observe that

$$r(-t) = r(s, s-t) = r(u+t, u)$$

$$= r(u, u+t) = r(t),$$

i.e., r(t) is an even function, hence so is $\rho(t)$.

If T is the set of all real numbers the spectral density $S(\omega)$ of the series (1) is defined as a constant multiple of the inverse fourier transform of r(t), provided

$$\int_{-\infty}^{\infty} r(t)\, dt < \infty:$$

$$S(\omega) = \int_{-\infty}^{\infty} e^{-i\omega t} r(t)\, dt. \tag{6}$$

Since r(t) is an even function, (6) becomes

$$S(\omega) = 2\int_0^\infty r(t) \cos \omega t \, dt. \tag{7}$$

It can be shown that

$$r(t) = \frac{1}{\pi} \int_{-\infty}^{\pi} e^{i\omega t} S(\omega) \, d\omega, \tag{8}$$

and that S is non-negative.

Since r(0) = σ^2, if we divide both side of (8) by σ^2 and let t = 0, we see that $\frac{S(\omega)}{\sigma^2\pi}$ is a probability density function.

The <u>cumulative ordinate</u> is defined by

$$C(\alpha) = \int_{-\infty}^{\infty} S(\omega) \, d\omega, \tag{9a}$$

and the <u>normalized cumulative</u> ordinate is defined by

$$N(\alpha) = \frac{C(\alpha)}{\sigma^2\pi}. \tag{10a}$$

Note that (10) is a probability distribution function. Now suppose (1) is weakly stationary and let T be the set of integers. We write $\rho(k) = \rho_k$ for the k-th autocorrelation coefficient and r(k) = r_k for the k-th autocovariance. Also let X(k) = $X_{k,}$ then (7) becomes

$$S(\omega) = \sigma_0 + 2\sum_{k=1}^{\infty} \sigma_k \cos \omega k, (\sigma_0 = \sigma^2) \tag{11}$$

(Note that some authors define the spectral density using $\rho(t)$ instead of r(t)).

Now we obtain

$$\sigma_k = \frac{1}{\pi} \int_0^{\pi} S(\omega) \cos k\omega \, d\omega. \tag{12}$$

Thus we can define a probability density function given by

$$S(\omega)/\sigma^2\pi,\ \omega \in [0, \pi]$$

and zero elsewhere. For the discrete case we have

$$C(\alpha) = \int_0^\pi S(\omega)\, d\omega, \tag{9b}$$

and

$$N(\alpha) = \frac{C(\alpha)}{\sigma^2\pi}. \tag{10b}$$

B. SAMPLE ESTIMATES

Suppose we are given a realization of a time series with observation taken at equally spaced time intervals

$$\{X_1, X_2, X_3, \ldots\ldots, X_n\} \tag{13}$$

Of course we may not be able to say whether or not (13) represents a weakly stationary series. As it turns out, we can compute the sample estimates of the spectral functions, and they are helpful in analyzing the series even if it is not weakly stationary.

Let $\overline{X}$ be the sample mean of (13). The sample autocovariance are defined by

$$s_k = \frac{1}{n}\sum_{t=1}^{n-k}(X_t - \overline{X})(X_{t+k} - \overline{X})$$

Then s_0 is the sample estimate of the variance of the series. Of course, all the estimates for s_k are biased.

For $\quad 0 \leq \omega \leq \frac{1}{2}$, let

$$a(\omega) = \frac{2}{n}\sum_{t=1}^{n} X_t \cos 2\pi\omega t,$$

$$b(\omega) = \frac{2}{n}\sum_{t=1}^{n} X_t \sin 2\pi\omega t \tag{14}$$

The <u>intensity</u> at ω is defined by

$$I(\omega) = \frac{n}{2}\left[a^2(\omega) + b^2(\omega)\right]$$

The set of points

$$\{(\omega, I(\omega)) : 0 \leq \omega \leq \frac{1}{2}\}$$

is called the <u>periodogram.</u>

$I(\omega)$ is called the <u>spectral ordinate</u> or <u>ordinate</u> at frequency ω.

Suppose now that n = 2m is an even integer and let ω_k = k/2m, k = 1, 2, 3, . . . ,m. We compute $a(\omega_k)$ and $b(\omega_k)$ by (14) for k = 1, 2, 3, ... ,m. It is convenient to let

$$a(\omega_m) = \frac{1}{n}\sum_{t=1}^{n} X_t \cos \pi t, \qquad b(\omega_m) = 0. \tag{15}$$

Now $a(\omega_k)$, $b(\omega_k)$ are then the coefficients of the cosine and sine terms in the fourier polynomial fit

$$X_t = a(0) + \sum_{k=1}^{m}\left[a(\omega_k)\cos\frac{2k\pi}{n}t + b(\omega_k)\sin\frac{2k\pi}{n}t\right], (t = 1,2,3,\ldots\ldots,n)$$

Here $a(0) = \overline{X}$.

It is more accurate here to define

$$I(\omega_m) = na^2(\omega_m)$$

$$I(\omega_k) = \frac{n}{2}[a^2(\omega_k) + b^2(\omega_k)], (k = 1, 2, 3, \ldots\ldots\ldots, m-1). \tag{16}$$

In [3], (pp 44-45), it is shown that

$$I(\omega_j) = 2[s_0 + 2\sum_{k=1}^{n-1} s_k \cos(2\pi\omega_j)k] \tag{17}$$

Now if for any $\omega \in [0, \frac{1}{2}]$, we define

$$I(\omega) = 2[s_0 + 2\sum_{k=1}^{n-1} s_k \cos 2\pi\omega k]$$

then it can be shown, see e.g. [7], that

$$\lim_{n\to\infty} E(I(\omega)) = 2S(2\pi\omega). \tag{18}$$

Thus $I(\omega_k)$ / 2 is, in the limit, an unbiased sample estimate of $S(2\pi\omega_k)$, where $I(\omega_k)$ is as defined in (16).

The cumulative ordinate is estimated as

$$C^*(\omega_k) = \sum_{i=1}^{k} I(\omega_i) = C_k, \tag{19}$$

and the normalized cumulative ordinate is estimated as

$$N^*(\omega_k) = \frac{C_k}{C_m} = N_k, (k = 1, 2, 3, \ldots\ldots, m). \tag{20}$$

Note that in general

$$0 \le N_1 \le N_2 \le N_3 \ldots\ldots \le N_m = 1.$$

From (18) we see that the statistic of (19) should be twice the proper estimate of the one we defined in (9b). However, it is important to note that the multiplier of 2 cancels out in (20).

It is shown by Kendall [9], that $I(\omega)$ will be large if ω is a latent frequency of the series (13).

The series (1) is called a white noise series if $\{X(t), t \in T\}$ are identically distributed with zero mean, common variance σ^2, and zero covariances.

If T is the set of integers, then from (11),

$$S(\omega) = \sigma^2 \omega, \ \omega \in [0, \pi]$$

The normalized cumulative ordinate is then the uniform distribution on $[0, \pi]$ given by

$$G(x) = 0, \quad x \le 0$$

$$G(x) = \frac{x}{\pi}, \ 0 < x \le \pi$$

$$G(x) = 1, \qquad x > \pi$$

A test of the hypothesis that (13) is a realization of a white noise series can be performed using the sample normalized cumulative ordinates N_k defined by (20). It is based on the Kolmogorov - Smirnov (KS) statistic [10], [11], which has been tabulated by Birnbaum [1].

Suppose Y is a random variable wiith distribution function F(x) from which a sample $\{Y_1, Y_2, \ldots, Y_p\}$ is drawn, $Y_1 \leq Y_2 \leq \ldots \leq Y_p$. Define a distribution F_p (x) by

$$F_p(x) = 0, x < Y_1$$

$$F_p(x) = k/p, Y_k \leq x < Y_{k+1}, (k = 1, 2, \ldots, p-1)$$

$$F_p(x) = 1, Y_p \leq x.$$

Now define

$$D_p = \mathrm{Sup} \, | F(x) - F_p(x) |$$

The distribution

$$\mathrm{KS(z)} = \mathrm{P}(D_p \leq z)$$

is called the KS distribution.

The white noise test on (13) is then performed at a significance level q as follows: Suppose n =2m in (13). Find the number z, 0 < z < 1 such that

$$\mathrm{P}(D_{m-1} \leq z) = 1 - \mathrm{q}.$$

Then we say that (13) passes the white noise test at significance level q if

$$\mathrm{Max}\left(\frac{k}{m-1} - z, 0\right) \leq N_k \leq \min\left(\frac{k}{m-1} + z, 1\right)$$

for each k = 1,2,. . . . ., m-1. See Fuller [5].

C. TABLES FOR THE PERIODOGRAM AND THE WHITE NOISE TEST.

In the periodogram tables which appear in this report, for each k, the first column contains the frequency k/n, the second column (labeled ordinate) contains the intensity I(k/n), the third column contains cumulative ordinate $C^*(k/n)$, and the last two columns contains the fourier coefficients a(k/n) and b(k/n), k = 1, 2, 3, ... , n/2.

In the tables for the white noise test (WNT), the first column is the number k, the second contains the normalized cumulative ordinate N_k, and the next two columns contain the end points of the confidence intervals in which N_k must lie. The F-ratio in the next column is not used in this report. When N_k lies outside its cofidence interval, the case is starred in the last column, and the series fails the WNT. All WNTs are performed at the 10 percent significance level.

D. FURTHER REFERENCES AND NOTES

For further information on the covariance function, see Iranpour and Chacon [6]. For further information on spectral analysis, see Fuller [5] and Jenkins and Watts [7].

The formulas of this appendix shows that the periodogram is unchanged if a constant is added to each term of (13). However, a moving average on the series will distort the periodogram to some extent. In pratice, a simple moving average may only cause small distortions in the periodogram.

TABLE A1

Computing the forecasts for a~~n~~ WM ~~SM~~MALT model

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
82	(1)	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
83	(2)	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}
FY 84	(3)	X_{25}	X_{26}	X_{27}	X_{28}	X_{29}	X_{30}	X_{31}	X_{32}	X_{33}	X_{34}	X_{35}	X_{36}
85	(4)	X_{37}	X_{38}	X_{39}	X_{40}	X_{41}	X_{42}	X_{43}	X_{44}	X_{45}	X_{46}	X_{47}	X_{48}
86	(5)	X_{49}	X_{50}	X_{51}	X_{52}	X_{53}	X_{54}	X_{55}	X_{56}	X_{57}	X_{58}	X_{59}	X_{60}
	(6)	M_1	M_2	M_3	M_4	M_5	M_6	M_7	M_8	M_9	M_{10}	M_{11}	M_{12}
residuals	(7)	$X_{49} - M_1 =$ R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	R_{12}
regression on the residuals	(8)	linear regression of $R_1 - R_{12}$ C_1	C_2	C_3	C_4	C_5	C_6	—	—	—	—	—	C_{12}
$M_1 + C_1 = F_1$	(9)	F_1	F_2	F_3	F_4	F_5	F_6	—	—	—	—	—	F_{12}

M × weight would be the WM model forecast ie does not

to make SMMALT into WMMALT, weight the X's ie
$\begin{cases} 82 \times .1 \\ 83 \times .1 \\ 84 \times .2 \\ 85 \times .2 \\ 86 \times .4 \end{cases}$

? why not a "C" for the column added to the "C" for the row? because it over-corrects